COUNTY OF MONTEREY
Department of Information Technology

Monterey County Operational Area
Emergency Communications System Task Force

MONTEREY COUNTY OPERATIONAL AREA
EMERGENCY COMMUNICATIONS SYSTEM
STRATEGIC PLAN

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EXECUTIVE SUMMARY

This report presents the findings, conclusions and recommendations of a consulting study to develop a strategic plan for the future development of voice and data radio communications systems in Monterey County, California. The overall goals of the project are to:

- Enhance interoperability;
- Comply with licensing rules and other legal requirements;
- Meet new mandates for narrow banding and re-banding;
- Reduce or control system costs;
- Replace outdated radio equipment throughout the County
- Upgrade radio systems to contemporary technical standards;
- Improve system coverage, capacity and overall performance;
- Improve system reliability and availability.

The specific objectives of the consulting engagement were to evaluate alternatives to meeting current and future agency needs, provide budgetary estimates for upgraded wireless capabilities, identify funding opportunities, and provide implementation recommendations. The scope of the engagement covered voice and data radio systems, organizational issues, and funding sources.

VOICE RADIO SYSTEMS

Voice radio systems operate under rules and regulations established and enforced by the Federal Communications Commission (FCC). These regulations cover technical system parameters, licensing, equipment type acceptance, frequencies, and modes of operation. In particular, FCC rules restrict public safety radio systems to portions of certain frequency bands. These include:

- Very High Frequency (VHF) Low Band, used for long range communications, typically by State Police;
- VHF High Band, typically used by agencies with county-wide coverage requirements;
- Ultra High Frequency (UHF), typically used in urban areas;
- 700 MegaHertz (MHz), a newly-allocated band to become available in 2009;
- 800 MHz, typically used for trunked radio systems in large urban areas.

Almost all public safety communications in Monterey County operates in the VHF High Band, the notable exceptions being Salinas Police Department and County Emergency Medical Services operation in the UHF band.

Two recent FCC initiatives will directly impact public safety communications in the County. The first, “narrow-banding”, requires conversion or replacement of wideband (25 KiloHertz (KHz)) public safety radio equipment (including most of the equipment currently used in the County) with narrow-band (12.5 KHz) equipment by January 1, 2013. The second initiative, “re-

banding", requires the conversion of the 800 MHz mobile data communications system currently used in the County to operate in a different portion of the 800 MHz band.

All of the major public safety voice radio systems in the County currently operate in "conventional" mode, where each functional communications channel requires a dedicated pair of radio frequencies and covers only a limited geographic area. Alternatives available with newer technology include "simulcast" which extends conventional coverage to wider geographic areas, and "trunking" which enables highly efficient sharing of a pool of radio frequencies in much the same way that long distance telephone users share a pool of telephone circuits.

The consultants reviewed radio system inventory and technical documentation provided by the County, interviewed agency representatives, examined typical equipment and visited representative radio sites. They found that:

- The 9-1-1 communications center is a modern state of the art facility well equipped to handle virtually any type of radio communications system, but it needs a backup for use in the event of a total outage of the facility.

- The County's microwave network is configured appropriately for the radio control application, and is robust and reliable, but needs extension to additional key locations.

- No two radio systems in the County share the same configuration of site locations and equipment, and the systems vary in their performance and coverage quality. For various historical and technical reasons, they require more radio sites than would likely be necessary for a new system designed from a "clean slate".

- Much of the mobile and portable radio equipment used by the public safety and non-public safety agencies reviewed in the study is in poor condition and/or unable to be upgraded to meet the FCC narrow-banding requirement. Most will need to be replaced as part of the system upgrade.

Requirements identified for a next generation radio system included:

- Replacement of obsolete equipment and compliance with the FCC narrow-banding requirement. Also, compliance with a national standard ("Project 25", or "P25") for performance and interoperability of public safety radio equipment.

- Enhanced channel capacity for current needs and future growth.

- Improved interoperability among County agencies and with outside agencies.

- Improved coverage in specified areas.

- Reduction of noise and interference on some of the radio systems.

- Improvement of conditions at certain radio sites.

The consultants and project Task Force considered a range of alternatives for meeting these requirements, including simulcast and trunking. The resulting recommendations were:

1. Implement a trunked VHF radio system for the high-capacity wide-area applications such as dispatch communications.

2. Encourage the broadest participation by the County's public safety and non-public safety agencies.

3. Implement dedicated Monterey County interoperability talk groups in the trunking system configuration.

4. Retain conventional channels (such as the State fire channels) where required for interoperability with external agencies and operations.

5. Procure mobile and portable radios which are dual-mode trunked/conventional, narrow-band VHF capable. Procure public-safety grade P25 compatible radios for the police, fire and Emergency Medical Services (EMS) agencies, and medium-grade non-P25 radios for the other agencies.

6. Consider acquisition of one or more gateways for ad-hoc on-scene interoperability with agencies in incompatible frequency bands.

7. Initiate a detailed engineering study to further design the trunked radio system, to include coverage analysis and optimal site selection.

8. Conduct a site remediation program to improve facilities for retained infrastructure and in anticipation of upgraded radio communications.

9. Conduct targeted studies to identify and mitigate any remaining noise and interference sources, and incorporate appropriate measurements and analysis to consider interference in replacement system designs.

The estimate of the range of costs (low to high) for the major components of the voice system upgrade project, and the total project, is:

Engineering Design Study	$	368,250	-	$ 466,850
Trunked System Fixed Equipment	$	3,750,000	-	$ 4,950,000
Trunked System Implementation Services	$	1,125,000	-	$ 1,485,000
Site Remediation	$	2,490,000	-	$ 2,902,000
Subscriber Radios	$	9,932,000	-	$ 13,372,500
Total	**$**	**17,665,250**	**-**	**$ 23,176,350**

DATA RADIO SYSTEMS

County agencies currently operate two types of wireless data communications systems. The first is an 800 MHz mobile data communications system shared by an informal consortium of ten law enforcement agencies. This system supports communications for dispatch instructions to field units, status updates from field units, access to Federal and State law enforcement data bases, and general text messaging. System performance is generally satisfactory. However, the fixed and mobile radio equipment supporting the system is old and obsolete and the system operating frequencies must be changed in accordance with the FCC re-banding requirement.

The second type of system, currently operated by the Cities of Salinas and Monterey, is a 2.5 GigaHertz (GHz) "Wireless Fidelity" (WiFi) system. This type of system offers high-speed performance for field incident reporting and other demanding applications, but only very limited geographic coverage. In addition, the band is not restricted to public safety or local government and so is subject to interference from unlicensed general users.

The general requirements for effective mobile data communications include:

- Adequate Bandwidth
- Assured Mobility
- High System Availability
- Appropriate Coverage
- High Security
- Cost Effectiveness

Alternatives considered by the consultants and project Task Force included commercial versus private ownership; licensed versus unlicensed operation; upgrade versus elimination or replacement of the 800 MHz data system; and various wideband alternatives including 2.5 GHz WiFi, "Wireless Maximum" (WiMax, a higher-performance version of WiFi), and 4.9 GHz public safety wideband. The resulting recommendations were:

1. Use communications infrastructure privately owned and controlled by public safety/local government agencies for high priority applications.

2. Use licensed public safety spectrum for all application requirements.

3. Retain and upgrade the existing 800 MHz mobile data system for the current low-bandwidth applications, with the possible addition of an automatic vehicle location application.

4. Use 4.9 GHz public safety wideband technology for medium-bandwidth and high-bandwidth applications, possibly extended by mesh network technology. Wideband system coverage would be restricted to limited urban areas.

5. Add fire service agencies and other public agencies as mobile data system users.

The cost of upgrading the existing low-bandwidth 800 MHz mobile data system will depend upon the outcome of re-banding negotiations currently in progress with Sprint/Nextel Corporation, and so no estimate was attempted for the purpose of this strategic plan. It may be noted, however, that a vendor-provided estimate of approximately $8 million was provided to completely replace the system.

Wideband system costs are estimated at approximately $250,000 per square mile of coverage.

ORGANIZATIONAL ISSUES

The organizational issues and alternatives considered by the consultants and Task Force included separate voice and data projects versus a combined project; separate public safety and non-public safety projects versus a combined project; and various alternatives for a regional communications organization. The resulting recommendations were:

1. Combine the voice and data projects, and the public safety and non-public safety projects, into a single consolidated project to take maximum advantage of coordinated equipment purchases, training, testing, project management, administration and support.

2. Create an organization wherein a User Advisory Committee would report to the County Board of Supervisors. The Committee and would oversee the activities of the County 9-1-1 Dispatch Department in managing the dispatch center, and the County Information Technology Department (ITD) Telecommunications Section in managing the deployment of radio telecommunications infrastructure.

FUNDING SOURCES

Funding alternatives reviewed in the study and discussed in the full report included a number of Federal formula funding and competitive grant programs, including specifically:

- Urban Area Security Initiative (UASI)
- State Homeland Security Grant Program (SHSGP)
- Law Enforcement Terrorism Prevention Program (LETPP)
- Justice Assistance Grant (JAG) Program
- Assistance to Firefighters Grant Program (AFGP)

- Community Oriented Policing Services (COPS) Interoperable Communications Technology Grant Program
- Commercial Equipment Direct Assistance Program (CEDAP)

Also considered were local and regional initiatives, such as congressional earmark/directed funding, municipal bonds, mill rate increases, and local government fees and assessment funds.

The funding recommendations are:

1. Use the formal regional governance structure previously discussed to guide collaborative efforts relating to fund seeking, acquisition, implementation and sustainment.

2. Develop a comprehensive fund seeking strategy, likely requiring coordinated approaches to a variety of funding sources.

3. Consider expanded regionalization, working with neighboring jurisdictions to jointly pursue funding opportunities tied to improved interoperability.

4. Develop a sustainment strategy for managing ongoing costs of maintenance, upgrades and eventual migration to future technologies.

SECTION 1
INTRODUCTION

This report presents the findings, conclusions and recommendations of a consulting study to develop a strategic plan for the future development of voice and data radio communications systems in Monterey County, California. This introductory section outlines the background, goals and objectives, and scope and approach of the consulting study, and provides an overview of the remainder of the report.

1.1 BACKGROUND

Monterey County occupies over 3,000 square miles on the central coast of California, having a permanent population of over 400,000 persons. The cities of Carmel, Del Rey Oaks, Gonzales, Greenfield, King City, Marina, Monterey, Pacific Grove, Salinas, Sand City, Seaside and Soledad are found within the County boundaries. Monterey County operates a unified public safety dispatch center in Salinas supporting almost forty public safety agencies.

The public safety agencies use a network of Very High Frequency (VHF) and Ultra High Frequency (UHF) voice radio systems consisting of 49 channels at 36 radio sites (all but one site is within Monterey County). Public works, parks departments and other local government organizations likewise use VHF and UHF radio communications to support their operations. The existing voice radio systems operate using wideband channels. These systems are generally outdated, having been designed in the 1980's and incrementally enhanced over time. Federal Communications Commission (FCC) initiatives require that future changes to these systems incorporate narrow band channels.

In addition to the voice radio systems, a mobile data system using 800 MegaHertz (MHz) channels is also in place, but is subject to recent FCC re-banding directives and is immediately affected by the "first wave" of transition coordination.

The public safety agencies in the County established a Task Force to consider the impacts of these initiatives, evaluate current and future agency requirements, and to coordinate regional radio communications. Due to the significant capital and maintenance costs for communications infrastructure, the complexity of frequency coordination, and the long lead times to obtain funding, the Task Force requested proposals for assistance from qualified consultants. The Monterey County Department of Information Technology, acting as contracting agent for the Task Force, subsequently retained **911Insight** and subcontractors Gary E. Boyd and Associates, Inc., and the Laura S. Lee Group, Inc. to assist in creating a strategic plan for radio systems in the County.

1.2 GOALS AND OBJECTIVES

The overall goals of the project are to:

- Enhance interoperability;
- Comply with licensing rules and other legal requirements;
- Meet new mandates for narrow banding and re-banding;
- Reduce or control system costs;
- Replace outdated radio equipment throughout the County
- Upgrade radio systems to contemporary technical standards;
- Improve system coverage, capacity and overall performance;
- Improve system reliability and availability.

The specific objectives of the consulting engagement were to evaluate alternatives to meeting current and future agency needs, provide budgetary estimates for upgraded wireless capabilities, identify funding opportunities, and to provide implementation recommendations.

1.3 SCOPE AND APPROACH

The consulting engagement was organized to address the above objectives in three "projects" or major phases:

Phase I – Voice Radio Systems
Phase II – Data Radio Systems
Phase III – Derivative Analysis and Summary Report

Each Phase was structured into a series of tasks as follows:

Phase I – Voice Systems

1.1 Review Current Environment
1.2 Interview Key Stakeholders
1.3 Assess Current Voice Systems
1.4 Analyze Feasibility of Alternatives
1.5 Develop Independent Recommendations
1.6 Prepare Budgetary Analysis
1.7 Conduct Task Force Workshop
1.8 Identify Funding Sources
1.9 Document Decision Environment

Phase II – Data Systems

2.1 Review Current Environment
2.2 Interview Key Stakeholders
2.3 Analyze Technical Alternatives
2.4 Identify Funding Sources
2.5 Document Decision Environment

Phase III – Derivative Analysis and Summary Report

3.1 Profile Advanced and Future Capabilities
3.2 Develop Executive Summary
3.3 Provide Consolidation Recommendations
3.4 Discuss Feasibility of Regional Organization

1.4 ORGANIZATION OF REPORT

The remainder of this report is organized in parallel to the phases and tasks listed above.

Section 2 of the report, "Voice Systems", describes the voice radio systems currently in use throughout the County, presents agency requirements, evaluates available alternatives, provides decision and cost analyses, and offers recommendations.

Section 3, "Data Systems", similarly describes the wireless data communications systems currently in use, presents and evaluates agency requirements and technical alternatives, provides decision and cost analyses, and offers recommendations.

Section 4, "Organizational Issues", evaluates alternatives for integrating Voice and Data wireless requirements into a single comprehensive project, as well as considering alternatives for organizational structures for a regional approach to the management and operation of radio systems in the County.

Section 5, "Funding Sources", reviews the current funding of radio communications in the County, and provides discussion of the potential external sources of funding for upgraded mobile data communications capabilities.

The Appendices provide detailed agency cost estimate data supporting the analysis, and a glossary of acronyms used in the report.

SECTION 2
VOICE SYSTEMS

This Section describes the voice radio systems currently in use throughout the County, presents and evaluates requirements and alternatives, provides decision and cost analyses, and offers recommendations. In particular, it profiles the communications center, control networks, radio sites, voice radio systems, and mobile and portable voice radio equipment currently used by public safety agencies in the County. Where information was provided, the voice radio systems and equipment currently used by the non-public safety agencies in the County are also described.

2.1 EXTERNAL ENVIRONMENT

This subsection reviews external influences on development of the voice radio systems in the areas of Federal Communications Commission mandates, vendor technology, national standards, and regional initiatives

Federal Communications Commission Mandates

In addition to certain general rules and regulations, the FCC rules and mandates regarding land mobile radio systems which are most pertinent to the Monterey County project include available frequency bands, re-farming, and re-banding.

General Rules

The FCC rules and regulations covering public safety and local government voice radio systems are specified in the Code of Federal Regulations (CFR) Title 47, Telecommunications; Chapter 1, Federal Communications Commission; Part 90, Private Land Mobile Radio Services. The rules specifically applicable to public safety are in Subpart B, Public Safety Radio Pool. The following are some FCC rules generally applicable to all Part 90 mobile radio systems:

- The rules control numerous technical parameters of the radio systems such as authorized emission masks, allowable output power, frequency stability, and others.

- Most radio systems must be licensed by the FCC. Any changes affecting the licensed technical parameters of the systems such as changes to transmitter locations, output power, antenna height, directional patterns, etc., must be coordinated by an authorized frequency coordinator approved by the FCC.

- All of the fixed, mobile and portable transmitter equipment must be of manufacturer's make and model that have been "type accepted" by the FCC.

- The frequencies used in most of the current conventional radio systems are eligible for use in trunked systems, subject to various rules and coordination requirements intended to ensure non-interference with neighboring systems.

Frequency Bands

The FCC rules allocate specific radio frequency bands for private land mobile radio operations. These bands and some of their pertinent characteristics relevant to Monterey County are as follows:

VHF Low Band. The VHF Low band was the first frequency band utilized for mobile radio. Its propagation characteristics enable long range communications, but are susceptible to skip interference and noise from distant locations. Low band radio equipment is typically bulky, with relatively large antennas required. Most local government agencies have transitioned out of low band into higher frequency bands, and new low band equipment offerings are limited. However, low band is used by the California Highway Patrol throughout the State, including in Monterey County.

VHF High Band. VHF high band is heavily utilized by public safety agencies serving large jurisdictional areas such as counties. VHF radio sites typically provide usable coverage out to 10-15 miles depending on the site elevation, terrain and other factors. Equipment is relatively compact and readily available. However, in most areas there are few or no available unused VHF frequencies and there is significant noise and interference. Most of the local government radio systems in Monterey County operate in the VHF band, including the Sheriff, all fire agencies, and most police departments.

UHF. The UHF band is generally used by agencies serving relatively limited geographic areas, such as urban police departments. In Monterey County the UHF band is used by the Salinas Police Department and County Emergency Medical Service. It is also used in point-to-point mode to connect control points to remote radio equipment.

700 MHz. Rules governing the 700 MHz band are in Part 90, Subpart R. These rules divide the band into narrowband general use channels, narrowband low-power channels, and wideband general use channels. The narrowband channels support voice communications on 6.25 KiloHertz (KHz) bandwidths. The wideband channels are intended for data communications on 50 KHz bandwidths. Applications for general use channels must be approved by Regional Planning Committees (RPCs) before being submitted to FCC approved public safety frequency coordinators. The low power channels are available for itinerant use nationwide without regional planning or frequency coordination. However, in most urban areas including the San Francisco Bay – San Jose region and Monterey County, the 700 MHz band is not available to public safety agencies until it has been cleared of incumbent UHF television stations. The current FCC

rules allow the stations to remain in the band until January 1 2006 or until 85% of households in the region convert to digital television sets, whichever is later. That conversion has been much slower than originally anticipated, so public safety agencies requested and Congress is considering revision of the rules to set a "date certain" for availability of the band, most likely early 2009. Meanwhile, the Northern California 700 MHz RCC has not yet adopted a regional allocation plan, and there are no 700 MHz systems in operation within Monterey County.

800 MHz. Like the 700 MHz band, the 800 MHz band is subject to both regional planning and frequency coordination. There are numerous 800 MHz voice radio systems in operation in northern California, and Monterey County has been allocated 10 channels in the Region 6 Plan. 800 MHz frequency allocations are currently being reconfigured in the "re-banding" process discussed below. In Monterey County a consortium of law enforcement agencies operates a mobile data communications system on four 800 MHz channels, and the Presidio Police and CSU Monterey Bay Parking and Transportation Services operate 800 MHz voice systems.

Public safety and local government agencies also operate systems in higher-frequency bands including 2.4 GigaHertz (GHz), 5.2 GHz, and a recent allocation of 4.9 GHz frequencies to public safety agencies. These bands are typically used for wideband data communications, including mobile data "mesh" networks. However they are also available for wideband point-to-point voice applications, such as replacement of multiple telephone circuits connecting control centers to remote radio sites. Monterey County has several such control links in operation, augmenting its microwave networks.

Narrow-Banding Initiatives

Increasing demand for radio spectrum coupled with technical advances in the design of narrow band capable radio equipment has motivated the FCC to establish a mandatory narrow banding program. This initiative, or "re-farming," will transition VHF and UHF mobile radio systems from their current 25 KHz bandwidths down to 12.5 KHz. This change will require the replacement of all base stations, mobile and portable radios, pagers and other such equipment that cannot comply with narrow band channelization.

The narrow band rules and deadlines have changed several times since the beginning of the program in 1995. The most recent rules (as of December 23, 2004) now allow public safety agencies to continue modifying and expanding existing 25 KHz systems until January 1, 2011. They may continue using, but not modifying or expanding, their systems for two more years after that, but must then complete their conversion and discontinue use of 25 KHz bandwidths by January 1, 2013.[*]

As a practical matter most radio equipment sold since the late 1990's is capable of narrow band operation, and few systems not capable of narrow band operation are likely

[*] Fifth Memorandum Opinion and Order, Sixth Report and Order, and Seventh Notice of Proposed Rulemaking, FCC 05-9 (WT Docket No. 96-86).

to remain in operation by 2013. However, as documented later in this Section, much of the mobile and portable equipment currently used in Monterey County is older 25 KHz equipment not capable of conversion to narrow band operation.

Re-Banding Initiatives

Over the last several years, the level of interference in the 800 MHz band has been increasing, due in part to an increasing number of low-site cellular telephone systems operating in close geographic and spectrum proximity to high-site public safety radio systems. On August 5, 2004 the FCC released Report and Order 04-168, beginning a major program to reduce this interference. The program has two key components. The first was the publication of a technical standard for measuring interference and determining if a licensee is entitled to protection from interference, and best practices technical guidelines for avoiding and reducing interference. The second component is a plan for reconfiguring or "re-banding" the 800 MHz band based on an agreement with the Nextel Corporation (now part of Sprint).

The re-banding plan requires Nextel cellular systems to move into a higher-frequency portion of the 800 MHz band, and the public safety radio systems currently in that portion of the band to move down into the spectrum vacated by Nextel. The result for public safety will be contiguous spectrum separated from the interfering cellular operations, and the possible availability of some additional 800 MHz channels. Nextel is required to pay all costs of the re-banding program.

The FCC has appointed a Transition Administrator (TA) to oversee the program. The TA has established a schedule in which various regions of the country are re-banded in a series of overlapping "waves". Monterey County's 800 MHz mobile data channels are affected by the re-banding program, and the County is in the first wave to be transitioned. Agencies in the first wave will negotiate their plans and costs with Nextel through the remainder of 2005, and re-banding is scheduled to be completed no later than January 1, 2008. The County Information Technology Department (ITD) has established contact with the TA and begun the process.

Technology Overview and National Standards

This subsection reviews current vendor technology and national standards affecting voice land mobile radio systems, specifically conventional mobile radio technology, trunking, simulcast, Project 25 and SAFECOM.

Conventional Radio Systems

All of the public safety and local government radio systems in Monterey County currently operate in a non-simulcast, conventional mode. In a conventional system radio frequencies are dedicated to specific channels. Simplex channels have only one frequency, and are generally used for short-range applications such as car-to-car, tactical or fire ground communications. Duplex channels use two frequencies and generally

operate using repeaters. In duplex mode dispatch centers, desktop control stations, and mobile and portable radios transmit on one of the frequencies to a repeater, and the repeater re-transmits the signal over a broad coverage area on the other frequency. This technique enables users to communicate with each other throughout the entire area covered by the repeater, and is typically used for point-to-multipoint dispatch communications.

Conventional systems have the disadvantage that each repeater covers only a limited geographic area, and the repeaters in neighboring areas must operate on different frequencies to avoid interference. Units moving between coverage areas must switch frequencies and coordinate the frequency change with the communications center. Also, because frequencies are dedicated to specific channels, the radio frequencies and equipment supporting one channel sit idle and unused between transmissions, while another channel covering the same area may be overloaded with traffic.

Simulcast

If two nearby transmitters in a conventional system operate simultaneously on the same frequency, their overlapping signals would generally be out of phase with each other and destructively interfere. (The transmitters "walk on" each other.) Conventional radio systems are therefore usually designed to prevent this type of simultaneous transmission by using only one transmitter site at a time on any given channel, or using directional antennas or spacing transmitters so far apart that their signals do not interfere.

In a simulcast system multiple nearby transmitters can transmit simultaneously on the same frequency. (Simulcast should not be confused with "simul-select", a common radio console feature enabling simultaneous transmission on <u>different</u> frequencies.) In simulcast the frequency, phase, power and other parameters of signals from the multiple transmitters are centrally and precisely controlled to keep them in phase with each other over the desired coverage area. This level of control requires an accurate external timing source, high-quality control circuits, and high-precision oscillators in the base station transmitters. Current state-of-the-art simulcast systems use the geo-positioning satellite (GPS) system for the timing signal, digital microwave or T1 land-line circuits for the control links, and high-stability rubidium oscillators.

A simulcast system can offer several major advantages:

- Improved coverage throughout the service area.
- Coverage of the entire service area on each simulcast channel.
- No need for special mobile and portable equipment.

The major disadvantage of a simulcast system is the cost of implementing and maintaining the high-precision timing and frequency control equipment and site-to-site links. In addition, simulcast systems can be difficult to optimize and maintain in adjustment to minimize zones of interference, with the difficulty increasing as the number of sites increases. The received audio may have a distorted sound in the

overlapping interference zones, so the system designers generally try to locate those zones in unpopulated areas. Modern simulcast technology has generally reduced these problems to manageable proportions and many public safety simulcast systems are now in operation throughout the United States.

Trunking

Trunking technology has been used in the telephone industry since almost the inception of long distance telephone service. Telephone callers do not own or control individual long distance telephone circuits. Instead, when a caller places a call, switching equipment selects an available circuit from a pool of circuits and assigns it to the caller for the duration of the call. As soon as the call is complete, the circuit goes back into the pool where it is immediately available for use by another caller.

Trunked radio systems use the same concept. Individual frequency pairs (channels) are not permanently dedicated to functions such as police dispatch or fire tactical communications. Instead, the channels are placed into a common pool, with one channel designated as a control channel. When a mobile unit wishing to communicate with the dispatcher or other mobile units in its talk group presses the push-to-talk button, his or her radio transmits a brief data message on the control channel requesting assignment of a working channel. The trunking system controller selects an available channel from the pool, and transmits back a data message on the control channel causing the requesting radio to switch to the assigned working channel. At the same time, all of the other mobile units in the fleet which currently have their radios set to the same talk group as the requesting radio receive the same data message and switch their radios to the same working channel. The data "handshake" and channel assignment process typically takes place in less than one-half second. The user may then proceed with the voice message, which is heard by all current members of the group.

Early trunking systems were found mostly in the 800 MHz band, but liberalized FCC rules now allow trunking in the VHF and UHF frequency bands, subject to coordination ensuring non-interference with other users. This enables the use of trunked radio systems in areas where VHF or UHF offers more suitable radio propagation characteristics, as in Monterey County.

A trunking system offers many advantages. One of the biggest advantages is system capacity, in terms of both the volume of calls and the number of virtual channels (or talk groups) the system can support. Because channels are assigned on demand in real time, they are utilized much more efficiently than in a conventional (non-trunked) system. Many more calls can be "packed" into the same channel allocation. Talk groups are no longer tied to physical channels, so many more talk groups can be accommodated, including temporary talk groups created "on the fly" for special situations.

A trunked system's large call volume and talk group capacity also enables multiple agencies to share the same system as well as interoperate with each other. In Monterey County, for example, many or all of the law enforcement and fire agencies might share a

common system with not only each other but with other non-public safety agencies. Talk groups could be organized to provide a multi-layered mutual aid communications structure compliant with the Incident Command System (ICS) protocols, while still giving each user agency the functional equivalent of its own private, high-capacity radio system.

Another major advantage of trunking systems is reliability. The loss of a single transmitter, or even an entire site in a multi-site system, would not necessarily disable any talk group. Instead, the effect perceived by the users would generally be seen, if at all, as a degradation in system performance (e.g., increased delay time to access a talk group).

A further advantage is the ability to organize trunking systems for wide-area coverage. One approach is to use the trunking controller to automatically re-assign frequencies to units as they move between repeater coverage areas, in much the same was as in commercial cellular telephone systems. Alternatively, trunking technology can be combined with simulcast for a wide-area high-capacity system.

There are no trunked public safety radio systems currently operating in Monterey County.

Project 25

In the 1970s the Association of Public Safety Communications Officials International (APCO) sponsored a project to define functional and operational standards for public safety radio systems, particularly trunked radio systems ("Project 16"). However, Project 16 did not provide detailed technical standards, with the result that competing radio manufacturers developed trunked radio systems which were individually compliant with the Project 16 standards but could not interoperate with each other.

Subsequently APCO, later joined by the Telecommunications Industry Association (TIA), initiated a new project, Project 25 or "P25" (adopted as TIA standard 102), to continue beyond Project 16 to define technical standards. Project 25 standards cover conventional and trunked radio systems operating on narrowband 12.5 KHz channels ("Phase I") and 6.25 KHz channels ("Phase II"), as well as digital transmission protocols. Portions of the standard addressing data communications at rates up to 9,600 bps are currently under development, as are additional subsystem interfaces. P25 is currently the "gold standard" for public safety communications, and multiple manufacturers now offer fully interoperable P25 equipment. However none of the major public safety communications systems currently operating in Monterey County are P25 compliant.

SAFECOM Program

The SAFECOM program was established by the Federal Office of Management and Budget after the 9/11 disaster, and is now managed by the Department of Homeland Security. SAFECOM seeks to promote improved public safety response capability through improved communications interoperability. Recent SAFECOM initiatives have included the development of a Statewide Interoperability Planning Methodology based on

State of Virginia planning experience, and the April 2004 release of a comprehensive Statement of Requirements for public safety communications interoperability. Future developments in public safety communications technology, and the availability of Federal funding for communications projects, will be heavily influenced by these SAFECOM initiatives.

Regional Initiatives

In the late 1980s the Federal Government developed a National Public Safety Planning Advisory Committee (NPSPAC) plan for public safety use of the 800 MHz radio spectrum, and established 55 Regional Planning Committees (RPCs) to tailor the plan to the particular needs of their regions. Monterey County is part of Region 6, covering Northern California. The Region 6 RPC developed an 800 MHz plan which was adopted by the FCC on November 20, 1990. The plan has since undergone a series of revisions, most recently on October 10, 2001. The 800 MHz plan provides for the assignment of frequencies to user agencies and interoperability channels. Monterey County currently uses four 800 MHz channels for mobile data communications.

In 1998, the FCC identified frequencies in the 700 MHz band for public safety use (as soon as the band is vacated by incumbent television stations) and assigned to the RPCs the responsibility to develop regional plans similar to the 800 MHz plans. However, the 700 MHz spectrum is currently blocked by television stations in the Northern California region, with no date certain for clearing the band. Further, the Region 6 plan for 700 MHz has not been completed. The eventual availability of both the band and the plan will be significant to Monterey County as the band will provide a large number of available public safety voice frequencies and will support medium-speed (50 KHz) data communications.

In 2003 the FCC released a block of spectrum at 4.9 GHz for public safety use for wideband data communications, and assigned to the 700 MHz RPCs the responsibility of regional planning. The Region 6 RPC is currently beginning development of a 4.9 GHz plan for the region.

2.2 CURRENT VOICE SYSTEMS

This Section profiles the communications center, control networks, radio sites, voice radio systems, and mobile and portable voice radio equipment currently used by public safety agencies in the County.

Communications Center

Monterey County is served by a new 9-1-1 Public Safety Answering Point (PSAP) and radio dispatch center located at 1322 Natividad Road in Salinas. The PSAP is equipped with:

- Watson Products console furniture;
- Zetron Integrator 3299 9-1-1 Telephone System;

- Interact Geo 9-1-1 Mapping System, integrated with the Zetron telephone system;
- Zetron ACOM PC-based radio consoles;
- Tiburon Computer-Aided Dispatch (CAD) system.

The Zetron console and radio control system is highly flexible and can support conventional and trunked, wideband and narrowband, simulcast, encryption, Voice over Internet Protocol (VoIP) and a wide range of other advanced radio system features and functions.

The communications center also serves as a primary radio site supporting local coverage and control links to remote sites. The radio equipment room in the Center is a model of contemporary planning and installation best practices.

The County does not currently have a well-developed backup site. However, a backup plan is under development. The planning committee is currently considering a backup facility at the County ITD facility (which is also a hub for the control link network), as well as an agreement with Santa Cruz County for transitional communications support during emergency switchovers to the backup center.

Summary Evaluation

The communications center is a modern, state-of-the art facility well equipped to handle virtually any type of radio communications systems likely to be deployed in the County in the foreseeable future. However, the Center currently has no viable backup, so the County is vulnerable to a total outage of centrally-controlled emergency communications capability in the event of a major disruption of the center, pending completion and implementation of a backup plan.

Control Networks

Monterey County radio system control points and remote radio sites are interconnected through a complex backbone network. The network is comprised primarily of 6 GHz digital microwave links augmented by a wide range of other link technologies including 23 GHz microwave, 5.8 GHz spread spectrum radio, fiber optic cable, telephone circuits ranging from individual radio control circuit lines up through T-1 circuits, and UHF radio control links.

The primary backbone network links the communications center and Sheriff's Department Headquarters facilities to the Salinas Court House and the ITD facility in a triangular configuration. Each of those three node points connect via additional microwave links to the Mount Toro radio site in the coast Range Mountains. From Mount Toro a microwave link extends in serial hops to the Monterey Courthouse and Seaside Water Tanks radio sites. A new microwave link to Williams Hill (Calandra) is currently planned.

The major microwave links are protected by hot-standby equipment redundancy. However, although the links form several diverse routes in the network, the system is not protected by automatic bi-directional loop switching technology.

Summary Evaluation

The control network is configured appropriately for the radio control application, and is considered to be generally robust and reliable. However, the primary backbone network does not extend to several important radio sites such as Williams Hill, Anderson Peak, Empire Grade and Little River (Big Sur). Also, the overall configuration of the network renders the radio system somewhat vulnerable to an outage of the Mount Toro radio site. If that site or its microwave capability were disabled the coastal area of the County could be isolated from emergency radio communications with the remainder of the County.

Public Safety Voice Radio Sites

The public safety radio systems in Monterey County are supported by thirty-six radio sites, including voting receiver sites. The scope of the current planning study did not permit visits to all or even most of the sites, but the consultants have visited the 9-1-1 communications center radio room as well as the Monterey Courthouse, Seaside Water Tanks, Ryan Ranch, and Monterey Fire Station #2 sites.

Exhibit 2-1 summarizes radio site inventory data provided by the County for the sites which have County-maintained public safety voice radio equipment. The equipment at the sites is tabulated by make and model and categorized into three broad categories:

- Equipment which is currently manufactured and supported by the vendors, and which is known to be capable of narrowband operation or conversion to narrowband;

- Equipment which is no longer currently manufactured by the vendors. However, some of this equipment may be capable of conversion to narrowband, and parts and service may still be available from local dealers.

- Equipment which could not be specifically identified as to make and model from the inventory data.

Summary Evaluation

The consultants were unable to assess physical conditions and housekeeping at all of the sites due to the limited scope of the planning engagement. However the sites that were visited display a wide range of conditions extending from excellent at the communications center to relatively poor at some of the small and remote voting receiver sites. Distributed ownership and a consequent lack of consistent engineering and maintenance likely account for much of variation.

The Motorola Quantar base station radios currently used at many of the sites are modern high-quality units that can be converted to digital narrowband operation. However, much of the other transmitter and receiver equipment at the sites would have to be phased out and replaced in a major system upgrade.

EXHIBIT 2-1
PUBLIC-SAFETY VOICE RADIO SITE INVENTORY SUMMARY

Radio Site	Radio Site Equipment Inventory																	
	Narrow Band Capable			No Longer Manufactured (But some are narrow-band capable)														
	Base - Motorola Quantar	Voting Comparator - Motorola T1766B	Voting Receiver - Motorola MTR-2000	Base - Motorola Desktrac	Base - Motorola Micor	Base - Motorola MSF-5000	Base - Motorola MSR-2000	Base - Motorola TKR-740/750	Link - Motorola Micor	Link - DX Radio RTF465A	Link - DX Radio RTFL4CWINB	Mobile - Motorola M120	Voting Receiver - Motorola Micor	Voting Receiver - DX Radio RTF-152	Voting Receiver Shelf - DX Radio RSF-433VTR	Base - Unknown	Voting Receiver - Unknown	Link - Unknown
American Tin Cannery			1															
AMR Marina																4		
Anderson Peak	1										1							
Bryant Canyon	1										1			1				
Community Hospitals																4		
CSU Monterey Bay						1						1						
Empire Grade	1																	
Forest Hill Manor (Pacific Grove)	1		1				1											
Huckleberry Hill						2		1										
Highway 1 @ Rio Road																	1	
J.C. Penney's													2					
Laguna Seca																1		
Laurel Yard			1										1					
Lewis Road							1			1				1				
Little River Hill (Big Sur)	1				1				1		1							
Mee Memorial King City																2		
Monterey Courthouse	3		1	1	1			1										
Monterey Fire Station #2																	1	
Mt. Toro	6	1		1		1		1	1		2		2		1			
Natividad Medical Center																3		
Pacific Grove City Yard (Sunset Blvd)			1															
Pebble Beach Golf Course																	1	
Pinion Peak (Highlands)							1											
Robert's Knoll					1									1				1
Ryan Ranch			1															
Salinas Courthouse	3	1		1		3												
Salinas Valley Memorial Hospital																3		
Seaside Water Tanks	2					1												
Williams Hill (Calandra)	4																	
Total	**23**	**2**	**6**	**3**	**3**	**8**	**3**	**3**	**2**	**1**	**5**	**1**	**5**	**3**	**1**	**17**	**3**	**1**

Public Safety Voice Radio Systems

The County's radio license database lists 318 public safety and local government radio systems identified by unique call signs. It was impossible within the scope of the project to review and evaluate each of these systems in detail. However, Exhibit 2-2 lists the major public safety voice systems operated or supported by the County and indicates the frequency band in which they operate (individual frequencies are not listed for purposes of security). For each system the

exhibit shows the system capability installed at each site; repeater, base station, control station, and/or voting receiver.

The consultants also reviewed coverage propagation maps provided by the County for some of the major systems.

Summary Evaluation

No two radio systems share the same configuration of sites and equipment. The Sheriff's primary channel, for example, uses an entirely different collection of radio sites than the Fire Red channel, although both have the same objective of covering the entire County in VHF. This may in part be due to the need to geographically separate equipment that might otherwise interfere with each other. However, it also illustrates that the radio systems were developed independently at different times, with varying engineering methodologies and available technology. The result today is that a higher number of sites must be supported than would likely be the case if planners could start over with a "clean slate". They could likely design an integrated system using fewer sites, optimized for coverage of the entire county and individual communities, and shared by all of the public safety and local government users.

The variations in system designs, configuration and equipment have also led to variations in system performance and coverage quality. Coverage is generally good on most of the major systems, but some "holes" remain (generally in different areas on the different systems). None of the systems currently has adequate coverage into the Big Sur area, and no attempt has been made to reliably cover remote unpopulated areas in the mountains on both sides of the Salinas Valley. On some of the systems coverage and performance has reportedly degraded over time, possibly because of increasing noise and interference from other areas, and because the wider band-spread capability of modern equipment increases its exposure to noise and interference.

EXHIBIT 2-2
PUBLIC SAFETY VOICE SYSTEMS INVENTORY SUMMARY

Agency/Channel	Freq Band	Radio Sites																													
		American Tin Cannery	AMR Marina	Anderson Peak	Bryant Canyon	Community Hospitals of Monterey Penninsula	CSU Monterey Bay	Empire Grade	Forest Hill Manor (Pacific Grove)	Huckleberry Hill	Hwy 1 @ Rio Road	J.C. Penny's	Laguna Seca	Laurel Yard	Lewis Road	Little River (Big Sur)	Mee Memorial King City	Monterey Courthouse	Monterey Fire Statioin 2	Mount Toro	Natividad Medical Center	Pacific Grove City Yard (Sunset Blvd)	Pebble Beach Golf Course	Pinball Hill	Pinions Peak (Highlands)	Roberts Knoll	Ryan Ranch	Salinas Courthouse	Salinas Valley Memorial Hospital	Seaside Water Tanks	Williams Hill (Calandra)
Carmel City	VHF										V												V								
CLEMARS	VHF																	B													
CSU Monterey Bay PD	VHF						R																								
CSU Monterey Bay Warrants	VHF						R																								
Del Rey Oaks Police Department *	VHF																														
Fire Blue	VHF																													R	
Fire Gold	VHF								R									C		B					R	R					
Fire Green (Salinas FD)	VHF											V		V						V								R			
Fire Red	VHF												R		R					R								C			R
Montrey Airport Police Department *	VHF																														
Monterey County EMS Med 1	UHF															R															
Monterey County EMS Med 10	UHF		C			C				R																					
Monterey County EMS Med 2	UHF					C											C			R	C								C		
Monterey County EMS Med 5	UHF																C				C								C		R
Monterey County EMS Med 6	UHF		C			C				R																					
Monterey County EMS Med 7	UHF		C																		C								R		
Monterey County EMS Med 9	UHF		C			C														R											
Monterey County OES	VHF																			R											
Monterey County OES Coast Guard	VHF																			R											
Monterey County Parks Rangers	VHF																			R				R,B							
Monterey County Probation	VHF													R				R													
Monterey County Sheriff Jail	VHF																											R			
Monterey County Sheriff Primary	VHF			R	V			R		V				V	V	R		C		R						V		C			R
Monterey County Sheriff Secondary	VHF																	C		R								C			
Monterey PD	VHF									R								B,V	V								V			R	
Pacific Grove PD	VHF	V							R													V									
Salinas PD 1	UHF											V								V								R			
Salinas PD 2	UHF																											R			
Salinas PD 3	UHF																											R			
Salinas PD 8	UHF																											R			
Seaside PD	VHF																	B,V													
South Cities Police	VHF				R																							C			

Note:
* = Site Configuration Data Not Provided in Inventory
R = Repeater
B = Base Station
C = Control Station
V = Voting Receiver

Public Safety Voice User Equipment Profiles

The consultants reviewed and summarized mobile and portable radio equipment inventory data collected by the County from the public safety voice radio system users within the County. Exhibit 2-3 summarizes the results for mobile (vehicular) radios, and Exhibit 2-4 summarizes the portable radios. The exhibits show the equipment count by agency for each type (make/model) of equipment, and categorize the results into the same categories discussed previously:

narrowband capable, no longer manufactured, and other/unknown. The exhibits reflect the inventory of all of the agencies that were contacted.

EXHIBIT 2-3
PUBLIC SAFETY VOICE MOBILE RADIO INVENTORY SUMMARY

Agency	Mobile Radio Inventory																																										
	Narrow-Band Capable													No Longer Manufactured																			Other/Unknown									
	Icom IC-F521	Kenwood TK730H	Kenwood TK760	Kenwood TK790	Kenwood TK890	Kenwood TK7150	Kenwood TM742A	Motorola Astro	Motorola CDM 750	Motorola CDM 1250	Motorola CDM 1550	Motorola MCS 2000	Motorola Radius	General Electric Phoenix SX	Motorola Astro-Spectra	Motorola GM300	Motorola M100	Motorola M225	Motorola M1225	Motorola Maratrac	Motorola Maxar	Motorola MaxTrac	Motorola MCX1000	Motorola Mitrek	Motorola Mostar	Motorola Motor Trac	Motorola SM120	Motorola SM50	Motorola Spectra	Motorola Syntor	Uniden SMHJ-400D	Ericsson - Unknown Model	Kenwood - Unknown Model	King - Unknown Model	Midland - Unknown Model	Motorola RT138 (Aircraft Radio)	Motorola - Unknown Model	Regency - Unknown Model	Unknown Type	Total
Law Enforcement Agencies																																											
Carmel Police Department			6	2																																							**8**
CSU Monterey Bay Police Department										4																			1													2	**7**
Gonzales Police Department																			6	3																						2	**11**
Greenfield Police Department										11																																	**11**
King City Police Department																8			2																								**10**
Marina Public Safety - Patrol Division		7		12		1				1										1												2					1					**25**
Monterey Airport Police Department													4																													**4**
Monterey City Police Department																																					23					**23**
Monterey County District Attorney		1														1						22				2			2								5			5	**38**
Monterey County Parks Rangers									1						1	2			2	4																	9				**19**
Monterey County Probation															2	5			8																		1				**16**
Monterey County Sheriff							1	66									1				2	19		5	1			11	73	11						1			1	**192**
Pacific Grove Police Department																		8																								**8**
Salinas Police Department								20													1			5					53													**79**
Sand City Police Department										6																																**6**
Seaside Police Department															28																											**28**
Soledad Correctional Training Facility		2																												5												**7**
Soledad Police Department																						6															1				**7**
Subtotal	**0**	**10**	**6**	**14**	**0**	**1**	**1**	**86**	**1**	**22**	**0**	**0**	**4**	**0**	**31**	**16**	**1**	**8**	**18**	**8**	**3**	**47**	**0**	**10**	**1**	**2**	**0**	**11**	**129**	**16**	**0**	**2**	**0**	**0**	**0**	**1**	**40**	**0**	**10**	**499**
Fire Agencies																																											
Big Sur Volunteer Fire Brigade																																	4				7			1	**12**
Carmel City Fire Department		3		8																			2																		**13**
Carmel Valley Fire		28		2	2																																				**32**
Gonzales Fire Department																						9																			**9**
Greenfield Fire Protection District				1												4											1								1						**7**
King City Fire Department	1															1			7																						**9**
Marina Public Safety - Fire Division		1	1	5												1				5																					**13**
Monterey Airport Fire Department				1																			1							3	1						1				**7**
Monterey City Fire Department				13																																					**13**
North County Fire Protection District																													22												**22**
Pacific Grove Fire Department																														9			3				1				**13**
Salinas Fire Department												7								1		1	9						12				1				2				**33**
Salinas Rural Fire Protection District			2	10																			1						1	7											**21**
Seaside Fire Department				13																																					**13**
Soledad Fire Department																						6								1											**7**
Spreckels Volunteer Fire Company				1																		1																			**2**
Subtotal	**1**	**32**	**3**	**54**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**0**	**0**	**6**	**0**	**0**	**7**	**6**	**0**	**17**	**13**	**0**	**0**	**0**	**1**	**0**	**35**	**20**	**1**	**0**	**8**	**0**	**1**	**0**	**11**	**0**	**1**	**226**
Monterey County EMS	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**20**	**20**
Total	**1**	**42**	**9**	**68**	**2**	**1**	**1**	**86**	**1**	**22**	**0**	**7**	**4**	**0**	**31**	**22**	**1**	**8**	**25**	**14**	**3**	**64**	**13**	**10**	**1**	**2**	**1**	**11**	**164**	**36**	**1**	**2**	**8**	**0**	**1**	**1**	**51**	**0**	**31**	**745**
Non-Participating Agencies																																											
Aromas Fire																																	3						11	**14**
Cachagua Fire District																																										**0**
Carmel Highlands Fire Protection District																																					4					**4**
Cypress Fire Protection District																																		6							**6**
Del Rey Oaks Police Department			10	1							1		4											1														3		**20**
Fort Hunter Liggett Police Department								10				2																													**12**
Mid Coast Volunteer Fire																																							6		**6**
Pebble Beach Fire																																	8								**8**
Presidio Fire Department				6							4			2																		1									**13**
Presidio Police Department																													22												**22**
San Ardo Volunteer Fire																																							2		**2**
South Monterey County Fire																																	8								**8**

EXHIBIT 2-4
PUBLIC SAFETY VOICE PORTABLE RADIO INVENTORY SUMMARY

Agency	Portable Radio Inventory																																										
	Narrow-Band Capable																			No Longer Manufactured																			Unknown				
	BK DPH	BK EPH	BK GPH	Kenwood TK2100	Kenwood TK2140	Kenwood TK280	Kenwood TK290	Kenwood TK380	Motorola EX500	Motorola GP1225	Motorola HT1250	Motorola HT2000	Motorola HT750	Motorola MTS2000	Motorola XTS3000	Relm RPV599A	Uniden SPH51DT	Vertex VX900V	General Electric PAJ02	Icom IC-H16	Midland 70-155B	Motorola CT250	Motorola GP300	Motorola HT P1225	Motorola HT1000	Motorola HT220	Motorola HT440	Motorola HT600	Motorola JT1000	Motorola MT1000	Motorola MT2000	Motorola MT500	Motorola P110	Motorola P200	Motorola Saber	Motorola Visar	Yaesu/Vertex 2070	Kenwood - Unknown Model	King - Unknown Model	Motorola - Unknown Model	Unknown	Total
Law Enforcement Agencies																																											
Carmel Police Department							15																																				**15**
CSU Monterey Bay Police Department																									19										4								**23**
Gonzales Police Department									15																7					2					1								**25**
Greenfield Police Department				6				1			17												5											2								1	**32**
King City Police Department																									18																		**18**
Marina Public Safety - Patrol Division																															15												**15**
Monterey Airport Police Department																															11												**11**
Monterey City Police Department													20																					5								**25**
Monterey County District Attorney																				1				3		1						1			6							**12**
Monterey County Parks Rangers																						1			16					4	1											**22**
Monterey County Probation													40										9														49					**98**
Monterey County Sheriff											6		32											1	289			138				30	1	41		10					3	**551**
Pacific Grove Police Department											29												3							2						1						1	**36**
Salinas Police Department											116				42									1	18			14						13	3	7							**214**
Sand City Police Department																									8									2								6	**16**
Seaside Police Department																									24										7							8	**39**
Soledad Correctional Training Facility																			5																								**5**
Soledad Police Department																									16																		**16**
Subtotal	**0**	**0**	**0**	**6**	**0**	**0**	**15**	**1**	**15**	**0**	**168**	**0**	**92**	**0**	**42**	**0**	**0**	**0**	**5**	**1**	**0**	**1**	**17**	**5**	**415**	**1**	**0**	**152**	**4**	**5**	**26**	**31**	**1**	**63**	**10**	**29**	**49**	**0**	**0**	**0**	**19**	**1173**
Fire Agencies																																											
Big Sur Volunteer Fire Brigade					12	1	1			9													11																				**34**
Carmel City Fire Department		3																18												4	11												**36**
Carmel Valley Fire							52																																				**52**
Gonzales Fire Department																10													2	5	4												**21**
Greenfield Fire Protection District						7																	2	6						1				2									**18**
King City Fire Department																	7													8													**15**
Marina Public Safety - Fire Division					1		3																								14					2							**20**
Monterey Airport Fire Department						3						6									4				1					6					2								**22**
Monterey City Fire Department	2	3	2																												35												**42**
North County Fire Protection District							18																						3		18				6								**45**
Pacific Grove Fire Department							13																				1		7	6													**27**
Salinas Fire Department						21	6																		11			1	7	15	7			5		8							**81**
Salinas Rural Fire Protection District							27																						2						7								**36**
Seaside Fire Department							33																													7							**40**
Soledad Fire Department																									8																		**8**
Spreckels Volunteer Fire Company					1																		4					2	2							2							**11**
Subtotal	**2**	**6**	**2**	**0**	**14**	**32**	**153**	**0**	**0**	**9**	**0**	**6**	**0**	**0**	**0**	**10**	**7**	**18**	**0**	**0**	**4**	**0**	**17**	**6**	**20**	**0**	**1**	**3**	**23**	**45**	**89**	**0**	**0**	**7**	**15**	**19**	**0**	**0**	**0**	**0**	**0**	**508**
Monterey County EMS	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total	**2**	**6**	**2**	**6**	**14**	**32**	**168**	**1**	**15**	**9**	**168**	**6**	**92**	**0**	**42**	**10**	**7**	**18**	**5**	**1**	**4**	**1**	**34**	**11**	**435**	**1**	**1**	**155**	**27**	**50**	**115**	**31**	**1**	**70**	**25**	**48**	**49**	**0**	**0**	**0**	**19**	**1681**
Non-Participating Agencies																																											
Aromas Fire																																						9				**9**
Cachagua Fire District																																									40	**40**
Carmel Highlands Fire Protection District						9	3																											7								**19**
Cypress Fire Protection District						11																												3								**14**
Del Rey Oaks Police Department																				3											12			3		1						**19**
Fort Hunter Liggett Police Department		3												10																												**13**
Mid Coast Volunteer Fire																																									12	**12**
Pebble Beach Fire																																							15			**15**
Presidio Fire Department					1	20																																				**21**
Presidio Police Department														15	53																				7							**75**
San Ardo Volunteer Fire																																									2	**2**
South Monterey County Fire																																							12			**12**

Summary Evaluation

Approximately sixty percent of the voice mobile and portable equipment currently used by public safety agencies in the County has been discontinued by its manufacturer and cannot be converted to narrow band operation. That equipment represents a minimum complement of system components that will have to be phased out of operation and replaced by current generation equipment by the mandatory deadline of January 1, 2013. Much of the remaining equipment, although narrow-band capable, is relatively old and in

poor condition. Mobile radios are generally replaced every seven to ten years, and portable radios are replaced every five to seven years.

Current Non-Public-Safety Voice Systems

This Subsection profiles the voice radio sites, systems and mobile and portable equipment currently used by the non-public safety agencies in the County.

Non-Public Safety Voice Radio Sites

Exhibit 2-5 tabulates the non-public safety voice system equipment inventory by radio sites. It should be noted the exhibit covers only those agencies with equipment operating at radio sites supported by the County. The County's license database also indicates numerous additional agencies may operate from other sites and did not provide inventory data. The survey results may therefore not be entirely representative of all of the non-public safety agencies.

Summary Evaluation

The same comments offered with regard to inconsistent physical site conditions in the public safety radio systems apply to the non-public safety systems, as many of the sites are the same. Approximately the same percentage of equipment would have to be replaced in a major system upgrade.

EXHIBIT 2-5
NON-PUBLIC SAFETY VOICE RADIO SITE INVENTORY SUMMARY

Radio Site	Radio Site Equipment								
	Narrow Band Capable	No Longer Manufactured (But some are narrow-band capable)						Unknown	
	Base - Motorola Quantar	Base - Motorola Desktrac	Base - Motorola Micor	Base - Motorola MSF-5000	Base - Motorola MSR-2000	Base - Motorola TKR-750-1	Mobile - Motorola Micor	Duplexer - Unknown	Link - Unknown
CSU Monterey Bay		1		1					
Laurel Yard	1			1					
Monterey Courthouse	1	1				1			
Mount Toro	4		2	1	2		1		
Ryan Ranch	1							1	
Seaside Water Tanks						1			
Williams Hill (Calandra)	2								
Total	**9**	**2**	**2**	**3**	**2**	**2**	**1**	**1**	**0**

Non-Public Safety Voice Radio Systems

Exhibit 2-6 lists the non-public safety systems operating radio equipment at County-supported radio sites.

Summary Evaluation

The same comments offered previously with regard to variations in the site configuration, coverage and performance of the public safety radio systems apply to the non-public safety systems.

EXHIBIT 2-6
NON-PUBLIC SAFETY VOICE SYSTEMS INVENTORY SUMMARY

		Radio Site						
Agency/Channel	**Freq Band**	**CSU Monterey Bay**	**Laurel Yard**	**Monterey Courthouse**	**Mount Toro**	**Ryan Ranch**	**Seaside Water Tanks**	**Williams Hill (Calandra)**
Carmel Union School District	VHF				R			
CSU Monterey Bay Maintenance	800 MHz	R						
CSU Monterey Bay Parking	800 MHz	R						
Monterey City Local Government	VHF			R				
Monterey County Agriculture	VHF				R			
Monterey County Housing Authority	UHF				R			
Monterey County Local Government	VHF			R	R			R
Monterey County Office of Education	VHF				R			
Monterey County Public Works	VHF				R			R
Monterey County Rain System	VHF				R			
Monterey Peninsula Airport	VHF					R	C	
Monterey Regional Water Agency	VHF				R			
Monterey-Salinas Rides	UHF				R			
Natividad Medical Center	VHF		R					
No Inventory Data Provided for Non-Public Safety								
Voice System Equipment at County-Supported Sites:								
City of Carmel								
City of Del Rey Oaks								
City of Greenfield								
City of Gonzales								
City of King City								
City of Marina								
City of Pacific Grove								
City of Salinas								
City of Sand City								
City of Seaside								
City of Soledad								

Note:

R = Repeater
B = Base Station
C = Control Station
V = Voting Receiver

Non-Public Safety User Equipment Profiles

Exhibits 2-7 and 2-8 respectively tabulate the non-public safety mobile and portable equipment.

Summary Evaluation

A higher percentage (more than two-thirds) of non-public safety mobile and portable equipment in the sample provided are obsolete and would need to be replaced.

EXHIBIT 2-7
NON-PUBLIC SAFETY VOICE MOBILE RADIO INVENTORY SUMMARY

Agency	Mobile Radio Inventory																		
	Narrow Band Capable			No Longer Manufactured													Other/ Unknown		
	Kenwood TK930	Kenwood TK930	Motorola MCS 2000	Motorola CM200	Motorola GM300	Motorola M100	Motorola M120	Motorola M1225	Motorola Maratrac	Motorola Maxar	Motorola MaxTrac	Motorola Micor	Motorola Mitrek	Motorola Mocom 70	Motorola Moxy	Motorola SM50	Motorola - Unknown Model	Standard HX1250SA (Marine)	Total
Monterey City Conference Center																			**0**
Monterey City Harbor/Marina	1	1			1													3	**6**
Monterey City Information Services																			**0**
Monterey City Off-Street Parking																			**0**
Monterey City Parking Enforcement					3	3											3		**9**
Monterey City Parking Maintenance					3												1		**4**
Monterey City Recreation Services																			**0**
Monterey County Public Works				1				67	12	6	1	1	3			1			**92**
Salinas Maintenance Services			2			9	1		42	7	9			2	1		30		**103**
Total	**1**	**1**	**2**	**1**	**7**	**12**	**1**	**67**	**54**	**13**	**10**	**1**	**3**	**2**	**1**	**1**	**34**	**3**	**214**
No inventory data provided for non-public safety mobile radios:																			
City of Carmel																			
City of Del Rey Oaks																			
City of Greenfield																			
City of Gonzales																			
City of King City																			
City of Marina																			
City of Pacific Grove																			
City of Sand City																			
City of Seaside																			
City of Soledad																			

EXHIBIT 2-8
NON-PUBLIC SAFETY VOICE PORTABLE RADIO INVENTORY SUMMARY

Agency	Portable Radio Inventory														
	Narrow Band Capable												Other/ Unknown		
	Motorola CP200	Motorola HT750	Motorola CP300	Motorola GP300	Motorola HT P1225	Motorola HT210	Motorola HT50	Motorola HT600	Motorola HT90	Motorola P100	Motorola P200	Motorola SP50	Motorola Unknown	Standard HX255S (Marine)	Total
Monterey City Conference Center	10											3			**13**
Monterey City Harbor/Marina				2										3	**5**
Monterey City Information Services			1		9										**10**
Monterey City Off-Street Parking													8		**8**
Monterey City Parking Enforcement							1	1	4			9	1		**16**
Monterey City Parking Maintenance						2							2		**4**
Monterey City Recreation Services								10							**10**
Monterey County Public Works		46		16		1		2		1	2				**68**
Salinas Maintenance Services															
Subtotal	**10**	**46**	**1**	**18**	**9**	**3**	**1**	**13**	**4**	**1**	**2**	**12**	**11**	**3**	**134**
No inventory data provided for non-public safety portable radios:															
City of Carmel															
City of Del Rey Oaks															
City of Greenfield															
City of Gonzales															
City of King City															
City of Marina															
City of Pacific Grove															
City of Sand City															
City of Seaside															
City of Soledad															

2.3 VOICE SYSTEM REQUIREMENTS

This Section summarizes voice system requirements in the areas of standards and mandates; capacity and growth; interoperability; coverage; interference mitigation; and remediation of site conditions.

National Standards

As a mandatory requirement all agencies in the County which remain in the UHF and VHF bands must replace or convert their systems to 12.5 KHz narrowband operation no later than January 1, 2013.

Another mandatory requirement is the replacement of obsolete equipment which has reached the end of its useful or maintainable life cycle. The equipment previously identified as no longer manufacturer supported, and/or incapable of upgrade to narrowband operation, is generally obsolete and must be replaced soon.

Compliance with the P25 standard is not mandatory, but is highly desirable for all public safety agencies. P25 systems and equipment provide the benefits of assured interoperability across manufacturers, digital protection against interference, and advanced features such as highly secure encryption.

Capacity and Growth

Information provided by the public safety agencies and the County's Radio Shop identified the need for at least the following additional capacity. (Note that each functional channel requires two frequencies.) This identifies a minimum requirement to alleviate current radio traffic overloads and provide for near-term growth in demand:

Agency	Application	Frequencies
Monterey Police Department	Surveillance/Narcotics	2
Gang Task Force	Countywide Operations	4
Sheriffs Department	Countywide Operations	4
Salinas Police Department	New Channel	2
Seaside Police Department	Fort Ord Patrol	2
Fire Chiefs' Radio Plan	Various	10
Other Agencies	Miscellaneous	10
	Total	**34**

Beyond the need for increased system capacity, additional channels/talk groups will be needed to meet the interoperability requirements discussed below.

Interoperability

The County has a general need for at least one countywide interoperability channel. The channel(s) should be accessible to all public safety agencies in the County, and ideally to those non-public safety agencies which interoperate with public safety agencies during emergencies and disasters.

The County Emergency Medical Services and Salinas Police Department currently operate on UHF channels. They have a need for interoperability with all of the other agencies which operate on VHF.

The California State University Monterey Bay Police Department currently operates on a military radio channel which is subject to revocation. They have a need for interoperability with County agencies, and in any case may be forced to move onto a public safety channel if the federal government requires them to discontinue use of the military channel.

If all of the above interoperability requirements were to be met by the addition of a VHF countywide channel and conversion of UHF to VHF, the new VHF frequencies required in addition to the "capacity and growth" frequencies previously discussed would be:

Agency	Application	Freqs
All Agencies	Countywide Interoperability	2
County EMS	Convert UHF to VHF	20
Salinas Police Department	Convert UHF to VHF	16
CSU Monterey Bay	Convert Military to VHF	2
	Total	**40**

Most of the public safety agencies in the County have a need for interoperability with the California Highway Patrol (CHP). Direct radio communications with CHP is not possible at present because CHP operates in the VHF low band, while the County agencies are in the VHF high band and UHF band. Messages currently have to be relayed through the County and CHP dispatch centers. Conversion of CHP to high band is not feasible, so other interoperability solutions must be considered. We understand that the CHP will be deploying multi-band radio capability in their patrol vehicles to ensure interoperability with local agencies.

All of the fire agencies in the County currently share VHF frequencies with the California Division of Forestry and Fire Protection (CDF) and other outside fire agencies, and interoperate frequently with those agencies. The common frequencies are allocated and operated under a highly-organized statewide fire communications plan. Any Monterey County interoperability solution must not interfere with the County fire agencies' participation in that statewide communications plan.

Coverage

Radio coverage is generally good throughout the County on most of the radio systems. However, the following are known specific coverage problem areas:

- King City Police Department service area;
- Monterey Police and Fire Department service area near Community Hospital of Monterey Peninsula;
- Monterey County Sheriff operation area near Pinball;
- Monterey County Sheriff costal operation areas south from Big Sur;
- In-building coverage in certain major buildings in Salinas.
- Monterey Peninsula local government operational areas.

Interference Mitigation

Most of the VHF radio systems experience noise and interference. The following have been identified as interference situations in particular need of mitigation:

- City of Monterey Police and Fire Department channels;
- Sheriff's Department Channels;
- Seaside Police Department Channel;
- Orange and Red Fire Channels (countywide).
- Monterey Peninsula Airport/Del Rey Oaks Police Department Channel.
- Pacific Grove Police Department Channel.
- Sheriff's North County Operational Area.

Remediation of Site Conditions

The consultants were unable to inspect or survey conditions at each individual radio site under the scope of this project. However, in consultation with the County radio shop the sites known to require remediation have been classified into two broad categories (minor remediation and major remediation), each having the following respective general requirements:

Minor Remediation – sites require generally require installation of battery or uninterruptible backup power systems, security systems, and/or remote monitoring systems. These sites include:

- Anderson Peak
- Community Hospital of Monterey Peninsula
- Laurel Yard
- Mee Memorial King City
- Monterey Fire Station 2

- Pacific Grove Police Department
- Salinas Courthouse
- Salinas Valley Memorial Hospital

Major Remediation – sites that require more extensive upgrades such as improved or replacement shelters, equipment enclosures, antenna towers, generators, fuel tanks, batteries, uninterruptible power systems, grounding, environmental control systems, security systems, and/or remote monitoring systems. These sites include:

- Carmel Police Department
- CSU Monterey Bay
- Forest Hill Manor (Pacific Grove)
- Huckleberry Hill
- Highway 1 at Rio Road
- Laguna Seca
- Lewis Road
- Little River (Big Sur)
- Monterey Courthouse
- Mount Toro
- Pinions Peak (Highlands)
- Pinball
- Roberts Knoll
- Ryan Ranch
- Seaside Police Department
- Seaside Water Tanks

The availability of critical radio communications is substantially dependent on the quality of facilities and fixed infrastructure.

2.4 VOICE SYSTEM ALTERNATIVES AND DECISION ANALYSIS

The major voice radio system alternatives relate to the issues of increasing the system capacity and improving its interoperability. The outcome of those choices will generally establish or constrain the solutions to the remaining requirements of compliance with mandates and standards, coverage improvement, interference mitigation and site remediation.

System Capacity Alternatives

The general alternatives for increasing the capacity of a radio system are to find more frequencies, and/or to change the system architecture to utilize the available frequencies more efficiently.

The frequency bands available for public safety voice systems are VHF, UHF, 800 MHz and 700 MHz. The consultants believe that some additional frequencies may be available in the VHF band, through such means as searching for unused frequencies, licensing VHF frequencies from other services (such as rural telephone or paging), use of interstitial frequencies, and outright purchase of licenses from other users. They concede, however, that these approaches are unlikely to secure the minimum 17 channels that would be needed for capacity and growth under the existing conventional system architecture, let alone the additional 20 channels needed for interoperability. The same situation applies in the UHF band. The 800 MHz band is so heavily used throughout the San Francisco Bay area that few (if any) additional channels are likely to be available, and use of those channels would require an expensive total system conversion including a requirement for trunked operation. The 700 MHz band will not be available until

2009 at the earliest, and may not provide large numbers of usable frequencies when interference and other design considerations are taken into account. This band will likely be subject to large system trunking requirements and other restrictions similar to the 800 MHz band. The consultants recommend that the County's agencies remain in the VHF band.

The architectural alternatives for increasing system capacity are simulcast and trunking. Simulcast can increase capacity by enabling one channel to cover a broad region rather than having to divide up the region into multiple areas with separate non-interfering channels. However, that capability has to be balanced against the limited traffic handling capacity of the single channel, and so is likely to work best where the requirement is for numerous functional channels but low individual channel traffic, and in any case offers only a modest increase in capacity. A trunking architecture can support upward growth both in terms of traffic handling capacity and the number of available talk groups. The consultants recommend a hybrid architecture using trunking for high-capacity, wide-area applications such as dispatch and routine agency communications, while retaining some conventional channels for interoperability as discussed below.

Interoperability Alternatives

Alternatives for interoperability include equipping users with multiple radios in different bands, multi-band radios, conversion of all users to a common band, shared use of primary working channels, implementation of dedicated interoperability channels, and the use of gateways.

Equipping users with multiple radios in different bands is an expensive and operationally clumsy measure (e.g., an individual wearing multiple portable radios) clearly not acceptable for the long term. There are some VHF/UHF multi-band radios on the market but their battery and transceiver performance is marginal and not acceptable for public safety operations. Improved software-definable multi-band radios may be available in the future, but no such products are currently available.

Converting all of the users to a common band is a requirement for basic interoperability. Once everyone is on the same band, allowing shared access to primary working channels is another approach that should be discouraged. The preferred alternative is dedicated "meet-me" interoperability channels which allow coordination without interfering with primary ongoing dispatch, command and tactical functions. The Incident Command System (ICS) communications plan assumes the availability of these types of dedicated interoperability channels. The consultants recommend conversion of the UHF user agencies to VHF to the extent possible and implementation of dedicated interoperability talk groups in the VHF trunking system.

If the County converts to a trunked architecture for basic dispatch and communications, there is still a need to retain conventional channels for interoperability. The fire departments, for example, could use the trunked system for countywide dispatch and command channels, but would still need to be able to communicate with CDF and other agencies on the statewide fire channels. As a practical matter most trunked systems are actually trunked/conventional hybrids, and trunked mobiles and portables can typically operate in either trunked or conventional mode

on a channel-by-channel basis. The consultants recommend retaining selected conventional system capability and the use of dual-mode equipment.

Gateways are currently the solution of choice for situations where operation in a common band cannot be achieved. This would be the case, for example, where Monterey County units on VHF high band must communicate directly with CHP units on low band or neighboring agencies on 800 MHz. The gateway temporarily connects radio channels together at the audio level, typically using portable radio equipment and only in a limited geographic area such as a major incident scene. We recommend that the County consider acquisition of gateway equipment as one method of providing ad-hoc interoperability.

Mandates and Standards Alternatives

Upgrade and replacement of equipment for trunking will necessarily involve the acquisition of narrow-band capability as well, as all VHF equipment currently on the market is required to be narrow-band capable. The consultants recommend that the public safety equipment for Police, Fire and EMS agencies be P25 compliant. Non-public safety agencies likely require only medium-grade non-P25 mobiles and portables.

Coverage Improvement Alternatives

Implementation of a narrow-band trunking system presents, and in fact requires, a “clean slate” opportunity to conduct a new analysis of radio propagation in the County and to select a new set of optimal radio sites. The consultants anticipate that a trunking system could cover the County with considerably fewer than the total number of sites currently being used. However, specific site alternatives would be identified and evaluated as part of a detailed engineering design study.

Interference Mitigation Alternatives

The existing level of noise and interference is likely to be substantially reduced as a result of general site “cleanup”, implementation of digital over-the-air protocols, and conversion to narrowband. Remaining sources of noise and interference could then be addressed through appropriate filter and antenna system design and, where necessary, negotiation with the interfering parties. The consultants recommend using all available measures to reduce or eliminate interference.

Site Remediation Alternatives

The major alternatives for improvement of the radio sites include, as necessary per specific site:

- Improve or replace shelters;
- Install equipment enclosures;
- Upgrade, replace or install antenna towers;
- Install generators and fuel tanks;

- Install batteries and uninterruptible power systems;
- Review and improve grounding;
- Install or upgrade environmental control systems;
- Install security systems and/or remote monitoring systems.

The consultants recommend improvements of this type be implemented as needed and in compliance with industry best practices for site construction and provisioning.

Non-Public Safety Agencies

A final set of alternatives is whether or not the non-public safety agencies should be included in the public safety system upgrade. If the County were to stay with a conventional system architecture, there would be little incentive to include the non-public agencies due to the cost of independently meeting separate agency needs. The public safety system equipment would be largely independent of the non-public safety system equipment, and there would be few economies of scale beyond bulk purchasing discounts. With the recommended trunked system design, however, the non-public safety agencies could share all of the common physical infrastructure with the public safety agencies without interfering with public safety operations, and in fact enabling enhanced interoperability with public safety. As each new user joins the system, the cost allocation to each of the other agencies would decrease. The consultants recommend that as many user agencies as possible be encouraged to participate in the system.

2.5 VOICE SYSTEM RECOMMENDATIONS

In summary, the following is recommended with regard to the voice radio system:

1. Implement a trunked VHF radio system for the high-capacity wide-area applications such as dispatch communications.

2. Encourage the broadest participation by the County's public safety and non-public safety agencies.

3. Implement dedicated Monterey County interoperability talk groups in the trunking system configuration.

4. Retain conventional channels (such as the State fire channels) where required for interoperability with external agencies and operations.

5. Procure mobile and portable radios which are dual-mode trunked/conventional, narrow-band VHF capable. Procure public-safety grade P25 compatible radios for the police, fire and EMS agencies, and medium-grade non-P25 radios for the other agencies.

6. Consider acquisition of one or more gateways for ad-hoc on-scene interoperability with agencies in incompatible frequency bands.

7. Initiate a detailed engineering study to further design the trunked radio system, to include coverage analysis and optimal site selection.

8. Conduct a site remediation program to upgrade facilities for retained infrastructure and in anticipation of upgraded radio communications.

9. Conduct targeted studies to identify and mitigate any remaining noise and interference sources, and incorporate appropriate measurements and analysis to consider interference in replacement system designs.

2.6 VOICE SYSTEM COST ESTIMATE

The following is the consultants' estimate of the range of costs (low to high) for the major components of the voice system upgrade project, and the total project:

Engineering Design Study	$	368,250	-	$ 466,850
Trunked System Fixed Equipment	$	3,750,000	-	$ 4,950,000
Trunked System Implementation Services	$	1,125,000	-	$ 1,485,000
Site Remediation	$	2,490,000	-	$ 2,902,000
Subscriber Radios	$	9,932,000	-	$ 13,372,500
Total	**$**	**17,665,250**	**-**	**$ 23,176,350**

Exhibit 2-9 provides a breakdown of the site remediation estimate by site and general category of remediation requirements.

EXHIBIT 2-9
SITE REMEDIATION COST BREAKDOWN

Site	Multiple Assets	High Site	Primary Site	Remediation Required: Minor	Remediation Required: Major	Budgetary Estimate
Anderson Peak		✓	Yes	Y		$ 20,000 - $ 23,000
Bryant Canyon		✓	Yes	OK	OK	
Calandra (Williams Hill)	✓	✓	Yes	OK	OK	
Carmel Police Department	✓				Y	$ 145,000 - $ 168,000
Community Hospitals of Monterey Peninsula				Y		$ 20,000 - $ 23,000
CSU Monterey Bay		✓	Yes		Y	$ 145,000 - $ 168,000
Empire Grade	✓		Yes	OK	OK	
Forest Hill Manor (Pacific Grove)	✓		Yes		Y	$ 145,000 - $ 168,000
Huckleberry Hill	✓		Yes		Y	$ 145,000 - $ 168,000
Hwy 1 @ Rio Road					Y	$ 145,000 - $ 168,000
Laguna Seca					Y	$ 145,000 - $ 168,000
Laurel Yard				Y		$ 20,000 - $ 23,000
Lewis Road					Y	$ 145,000 - $ 168,000
Little River (Big Sur)	✓	✓	Yes		Y	$ 145,000 - $ 168,000
Mee Memorial King City	✓		Yes	Y		$ 20,000 - $ 23,000
Monterey Courthouse	✓		Yes		Y	$ 145,000 - $ 168,000
Monterey Fire Station 2				Y		$ 20,000 - $ 23,000
Mount Toro	✓	✓	Yes		Y	$ 145,000 - $ 168,000
Pacific Grove Police Department				Y		$ 20,000 - $ 23,000
Pinions Peak (Highlands)					Y	$ 145,000 - $ 168,000
Pinball	✓	✓	Yes		Y	$ 145,000 - $ 168,000
Roberts Knoll		✓	Yes		Y	$ 145,000 - $ 168,000
Ryan Ranch					Y	$ 145,000 - $ 168,000
Salinas Administration Building	✓		Yes	Y		$ 20,000 - $ 23,000
Salinas Valley Medical Hospital				Y		$ 20,000 - $ 23,000
Seaside Police Department					Y	$ 145,000 - $ 168,000
Seaside Water Tanks	✓		Yes		Y	$ 145,000 - $ 168,000
Special Interference Mitigation						$ 10,000 - $ 30,000
					TOTAL	**$ 2,490,000 - $ 2,902,000**

Notes

Salinas Admin Building costs contemplate moving from Salinas Courthouse (i.e., New Site)
Cost Components include:

Minor Remediation	Battery Supply/Uninterruptible Power Supply		$ 15,000 - $ 17,000.00
	Security/Remote Monitoring		$ 5,000 - $ 6,000.00
		Subtotal	***$ 20,000 - $ 23,000***
Major Remediation	Shelter/Equipment Enclosure		$ 30,000 - $ 35,000.00
	Antenna Tower		$ 50,000 - $ 58,000.00
	Generator and Fuel Tank		$ 25,000 - $ 29,000.00
	Battery Supply/Uninterruptible Power Supply		$ 15,000 - $ 17,000.00
	Grounding		$ 5,000 - $ 6,000.00
	HVAC		$ 15,000 - $ 17,000.00
	Security/Remote Monitoring		$ 5,000 - $ 6,000.00
		Subtotal	***$ 145,000 - $ 168,000***

Exhibit 2-10 provides a breakdown of the trunked system common infrastructure cost estimate. For purposes of cost estimating the estimates assume that ten sites are required. Five of those sites are equipped with twelve base stations (physical channels), and the other five sites are equipped with six base stations.

EXHIBIT 2-10
TRUNKED SYSTEM COMMON INFRASTRUCTURE COST BREAKDOWN

Project	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Fixed Equipment									
12-Channel Sites (5 Sites):									
Base Stations	60		$ 25,000	-	$ 30,000		$ 1,500,000	-	$ 1,800,000
Site Controllers	5		$ 50,000	-	$ 75,000		$ 250,000	-	$ 375,000
6-Channel Sites (5 Sites):									
Base Stations	30		$ 25,000	-	$ 30,000		$ 750,000	-	$ 900,000
Site Controllers	5		$ 50,000	-	$ 75,000		$ 250,000	-	$ 375,000
Central Control Equipment:									
Trunking System Controller	1		$ 1,000,000	-	$ 1,500,000		$ 1,000,000	-	$ 1,500,000
					Subtotal, Equipment		**$ 3,750,000**	**-**	**$ 4,950,000**
Implementation Services									
Project Management	10%		$ 3,750,000	-	$ 4,950,000		$ 375,000	-	$ 495,000
Frequency Coordination/Licensing	5%		$ 3,750,000	-	$ 4,950,000		$ 187,500	-	$ 247,500
Test and Acceptance	5%		$ 3,750,000	-	$ 4,950,000		$ 187,500	-	$ 247,500
Contingency	10%		$ 3,750,000	-	$ 4,950,000		$ 375,000	-	$ 495,000
					Subtotal, Implementation		**$ 1,125,000**	**-**	**$ 1,485,000**
Engineering Design Study									
Percentage of Fixed Equipment	5%		$ 3,750,000		$ 4,950,000		$ 187,500	-	$ 247,500
Percentage of Implementation Services	5%		$ 1,125,000		$ 1,485,000		$ 56,250	-	$ 74,250
Percentage of Site Remediation	5%		$ 2,490,000	-	$ 2,902,000		$ 124,500	-	$ 145,100
					Subtotal, Engineering		**$ 368,250**	**-**	**$ 466,850**
					TOTAL		**$ 5,243,250**	**-**	**$ 6,901,850**

Notes

Implementation services costs are estimated as a percentage of fixed equipment costs.
Engineering study costs are estimated as a percentage of fixed equipment, implementation services, and site remediation costs.
Agency costs for reprogramming or replacing subscriber equipment are included in individual Life Cycle estimates (Appendix A).
Costs assume suitable sites/facilities available (i.e., shelter, tower, power, connectivity).

Subscriber radio equipment costs have been estimated separately for each of the user agencies, and are listed in the agency summaries in Appendix A.

Exhibit 2-11 provides a summary of the total cost by user agency. The estimates assume the participating agencies to be those which provided inventory data for the present strategic plan.

The estimates also assume that site remediation and common infrastructure costs are allocated to each agency in proportion to the distribution of mobile and portable radios. The subscriber equipment portion of the estimates also assumes subscriber equipment replacement.

EXHIBIT 2-11
SYSTEM COST BREAKDOWN BY AGENCY

	One-Time Costs		
Law Enforcement Agencies			
Carmel Police Department	$152,619	-	$200,286
CSU Monterey Bay Police Department	$195,633	-	$259,526
Gonzales Police Department	$237,359	-	$312,731
Greenfield Police Department	$281,374	-	$372,470
King City Police Department	$186,057	-	$243,957
Marina Dept of Public Safety - Patrol	$276,510	-	$353,868
Monterey Airport Police Department	$98,316		$130,013
Monterey City Police Department	$324,813	-	$421,141
Monterey County District Attorney	$352,388	-	$445,710
Monterey County Parks Rangers	$276,798		$359,402
Monterey County Probation	$732,805		$980,898
Monterey County Sheriff's Office	$4,863,807	-	$6,436,905
Pacific Grove Police Department	$284,661	-	$379,504
Salinas Police Department	$1,921,314	-	$2,540,018
Sand City Police Department	$144,331	-	$190,752
Seaside Police Department	$449,280	-	$585,791
Soledad Correctional Training Facility	$82,453	-	$105,910
Soledad Police Department	$151,619	-	$199,786
Subtotal	**$ 11,012,137**	**-**	**$ 14,518,670**

EXHIBIT 2-11 (CONTINUED)
SYSTEM COST BREAKDOWN BY AGENCY

Fire Agencies

Big Sur Volunteer Fire Brigade	$	301,237	- $	398,573
Carmel City Fire Department		321,100	-	424,675
Carmel Valley Fire		560,172	-	732,872
Gonzales Fire Department		197,633	-	260,526
Greenfield Fire Protection District		164,194	-	216,855
King City Fire Department		159,906	-	209,321
Marina Dept of Public Safety - Fire		220,496	-	288,128
Monterey Airport Fire Department		189,345	-	250,992
Monterey City Fire Department		358,827	-	475,881
North County Fire Protection District		443,280	-	582,791
Pacific Grove Fire Department		264,510	-	347,868
Salinas Fire Department		749,805	-	989,398
Salinas Rural Fire Protection District		379,402	-	496,949
Seaside Fire Department		346,251	-	458,812
Soledad Fire Department		101,316	-	131,513
Spreckels Volunteer Fire Company		83,741		111,945
Subtotal	**$**	**4,841,217**	**- $**	**6,377,097**

Emergency Medical Service

Paramedic/Ambulance	**$**	**145,755**	**- $**	**180,684**

Non-Public Safety Agencies

Monterey City Conference Center		62,241	-	78,445
Monterey City Harbor/Marina		52,665	-	66,376
Monterey City Information Services		47,878	-	60,342
Monterey City Off-Street Parking		38,302	-	48,274
Monterey City Parking Enforcement		119,694	-	150,855
Monterey City Parking Maintenance		38,302	-	48,274
Monterey City Recreation Services		47,878	-	60,342
Monterey County Public Works		766,042	-	965,471
Salinas Maintenance Services		493,139	-	621,522
City of Carmel *				
City of Del Rey Oaks *				
City of Greenfield *				
City of Gonzales *				
City of King City *				
City of Marina *				
City of Pacific Grove *				
City of Sand City *				
City of Seaside *				
City of Soledad *				
Subtotal	**$**	**1,666,141**	**- $**	**2,099,899**
Total	**$**	**17,665,250**	**- $**	**23,176,350**

* No inventory data provided for cost allocation.

SECTION 3
DATA SYSTEMS

This Section describes the wireless data communications systems currently in use, presents and evaluates requirements and technical alternatives, provides decision and cost analyses, and offers recommendations.

3.1 CURRENT DATA SYSTEMS

The Monterey County Department of Information Technology supports a mobile data communications system serving an informal consortium of ten law enforcement agencies in the County:

- California State University Monterey Bay Police Department
- City of Carmel Police Department
- City of Greenfield Police Department
- City of King City Police Department
- City of Marina Department of Public Safety
- City of Monterey Police Department
- City of Pacific Grove Police Department
- City of Salinas Police Department
- City of Soledad Police Department
- Monterey County Sheriff's Department

The system costs are shared by the participating agencies, but there is no formal interagency agreement governing the system.

The system supports the following functional applications:

- Dispatch message communications from the Central Communication's Tiburon Computer Aided Dispatch (CAD) System to mobile computer terminals (MCTs) in law enforcement vehicles. These messages provide initial and updated incident location, status and other information to field units assigned to respond to incidents.

- Status messaging from field units back to the communications center and CAD system, indicating arrival on scene, cleared from scene, available, out of service, etc.

- Data base inquiry/response through the California Law Enforcement Telecommunications System (CLETS) to the National Criminal Information Center (NCIC), the California Department of Motor Vehicles (DMV) and other data bases.

- General car-to-car and car-to/from-communications center messaging.

The primary vendor for the system is Data Radio, Inc. The system operates at a maximum data rate of 9,600 bits per second (bps). The system uses four 800 MHz conventional duplex radio channels installed in repeaters at six radio sites (note that not all channels are available at all sites):

- Fort Roberts
- Huckleberry Hill
- Mount Toro
- Salinas Courthouse
- Smith Road
- Williams Hill (Calandra)

The mobile data repeaters are General Electric Master III base stations which are obsolete and no longer manufactured.

The following quantities of MCTs are currently deployed:

Salinas	72
Sheriff	67
Monterey	17
Marina	10
Pacific Grove	6
Carmel	4
King City	4
Soledad	3
Greenfield	3
CSUMB	3
Total	188

The mobile radios included in the MCT packages are General Electric and Tait units which are obsolete.

The Cities of Salinas and Monterey have independently implemented 2.5 GHz broadband WiFi systems. These systems are accessible from the mobile computers accessing the County mobile data system, but the modems, radios and infrastructure are entirely separate.

3.2 DATA SYSTEM REQUIREMENTS

General agency requirements for mobile data communications include:

- Adequate Bandwidth
- Assured Mobility
- High System Availability
- Appropriate Coverage
- High Security
- Cost Effectiveness
- Extension of mobile data services to fire agencies and other agencies.

Advanced and potential future requirements include:

- Robotics
- Patient Monitoring/Biomedical Telemetry
- Personal Positioning (In-Building)
- Full Motion Mobile/Aerial Video
- Ground/Wall Probing Radar

The bandwidth requirements of mobile data communications applications vary depending on the type of application. For example:

- **Low Bandwidth:**
  CAD, CLETS/NCIC, Text Messaging, Automatic Vehicle Location (AVL)

- **Medium Bandwidth:**
  Records Management Systems (RMS), Field Reporting

- **High Bandwidth:**
  Images, Maps, Pre-Plans
  Pictures, Video
  Software, Database Updates

The coverage performance of the current mobile data system is reported as generally adequate, with only a few gaps in coverage. The system is also considered reliable, and users find it responsive within the limitation of its maximum data rate.

However, the system does not support advanced applications the user agencies would like to have, such as AVL, automatic personnel location, field reporting, mobile graphics (fingerprints, mug shots, etc.), and mobile video.

The 800 MHz channels used in the system are affected by the FCC rebanding program, and if the system is retained, all of the fixed and mobile radio equipment will have to be re-tuned or replaced as part of that program.

3.3 DATA SYSTEM ALTERNATIVES AND DECISION ANALYSIS

The major alternatives with regard to Monterey County mobile data communications relate to ownership, licensing, and technology.

Ownership

The ownership and licensing alternatives include: commercial ownership, private ownership with licensed operation, and private ownership using unlicensed operation.

Several companies in the past have made serious efforts to offer public safety mobile data communications services on a commercial basis. Early providers such as RAM Mobile Data sold a few proprietary systems and then withdrew from the market. More recently, AT&T Wireless and others offered Cellular Digital Packet Data (CDPD) service which was adopted by a significant number of public safety agencies. However as technology evolved the service was no longer cost effective for the carriers and was abruptly discontinued. The major PCS Wireless (digital cellular telephone) carriers such as Sprint and Verizon currently offer text messaging and limited internet access services as an adjunct to their voice services, but are not actively promoting these services to the public safety market. This history illustrates both the attraction of commercial mobile data service (i.e., low capital cost) and the significant disadvantages:

- No control over bandwidth, availability, service restoration, or costs
- No coverage guarantees
- No guarantee of priority for service over non-public safety users
- No guarantee of continuation of service or acceptable upgrade path

The consultants recommend that data communications infrastructure should be privately owned and controlled by public safety/local government agencies.

Licensing

The low bandwidth public safety data communications networks generally operate in licensed and coordinated spectrum such as the 800 MHz band. However, currently available high bandwidth networks can operate in unlicensed spectrum (e.g., 2.4 GHz) or licensed public safety spectrum (4.9 GHz). The unlicensed spectrum is open to use by the general public and so is inherently insecure and subject to uncontrolled noise and interference from numerous sources, with no recourse to the FCC. The consultants therefore recommend the use of licensed public safety spectrum.

Technology

Each of the three mobile data application categories presents a different set of technology alternatives with regard to frequency band, mobility, and coverage.

Low Bandwidth Applications

The low bandwidth applications include dispatch; text database inquiry such as CLETS and NCIC; short text messaging, and automatic vehicle location signaling. Requirements these applications have in common are:

- Data communications at relatively low data rates, i.e., 4.8 – 9.6 kbps.
- Ubiquitous coverage throughout the County.

- Reliable operation from vehicles moving over long distances at high speeds.

These requirements can be met by RD-LAP and other low-speed mobile data communications protocols operating over 12.5 KHz narrowband radio channels. The major alternatives for the County are to retain and upgrade the existing 800 MHz mobile data system, or replace the system with a low-bandwidth mobile data system operating through the voice system trunking controller. The 800 MHz system is providing generally satisfactory service at present but, if retained, would require at least the replacement of radios as part of the 800 MHz re-banding initiative. The trunking system controller alternative is a compromise generally suitable only for relatively small low-capacity mobile data systems, and uses system resources that would otherwise be available for the voice application. The consultants recommend retaining and upgrading the 800 MHz system for the low bandwidth applications.

Medium Bandwidth Applications

Applications with medium bandwidth requirements include "heavy text" applications such as records management system access, field incident reporting, fire inspection reporting, and electronic mail. Requirements are:

- Data communications speeds in the 19.2 – 50 kbps range.
- Coverage to fixed hotspots, limited urban zones, and incident scenes.
- Coverage to stationary vehicles and portable devices.

These requirements could be met by use of 50 KHz public safety channels in the 700 MHz band when that band becomes available in 2009 or later. However, they can also be met and exceeded by the wide band alternatives discussed below. The 700 MHz band could also host the low bandwidth applications previously discussed, but would offer no particular advantages for those applications. The consultants recommend that the County not invest in special infrastructure dedicated to medium speed applications alone, but instead host them on a wide band mobile data system.

High Bandwidth Applications

The high bandwidth applications involve transmission of color graphics, photographs, fingerprints, video, software and file uploads and downloads, and other large volumes of data. Requirements include:

- Cost effective coverage.
- Communications at high speeds, characteristic of Digital Subscriber Line (DSL) and cable modems.
- Coverage to stationary vehicles and portable devices.

Applicable technologies include 2.5 GHz WiFi and WiMax, 4.9 GHz public safety broadband, and mesh network technology in either band. 2.5 GHz WiFi is currently used in several cities in Monterey County, and the emerging WiMax technology will improve its bandwidth and coverage performance. However, 2.5 GHz is an unlicensed band open to the general public and so is not recommended moving forward as previously discussed. The 4.9 GHz band can support technologies similar to WiFi and WiMax, and can be operated in mesh configurations where potentially every access point acts as a repeater to extend coverage by relaying data packets to fixed stations for backhaul into the terrestrial data network. 4.9 GHz is a licensed band, but is not subject to frequency coordination. Negotiation with nearby users may therefore be necessary until the Regional Coordinating Committee completes development of a regional plan. The consultants recommend use of 4.9 GHz technology for high bandwidth mobile data applications.

3.4 DATA SYSTEM RECOMMENDATIONS

In summary, the following is recommended with regard to the mobile data radio system:

1. Use communications infrastructure privately owned and controlled by public safety/local government agencies for high priority applications.

2. Use licensed public safety spectrum for all application requirements.

3. Retain and upgrade the existing 800 MHz mobile data system for the current low-bandwidth applications, with the possible addition of an automatic vehicle location application.

4. Use 4.9 GHz public safety wideband technology for medium-bandwidth and high-bandwidth applications, possibly extended by mesh network technology.

5. Add fire service agencies and other public agencies as mobile data system users.

3.5 DATA SYSTEM COST ESTIMATE

The cost of upgrading the existing low-bandwidth 800 MHz mobile data system will depend upon the outcome of re-banding negotiations currently in progress with Sprint/Nextel Corporation, and so no estimate was attempted for the purpose of this strategic plan. It may be noted, however, that Motorola provided the consultants an estimate of approximately $8 million to completely replace the system.

Exhibit 3-1 provides estimates of costs to implement 4.9 GHz high-bandwidth networks in each of the cities in the County, based on the number of square miles contained within the city limits and commonly accepted “rules of thumb” for access point density and overall cost per square mile.

EXHIBIT 3-1
WIDEBAND DATA COST ESTIMATE

Broadband Data Infrastructure: 2.4/4.9 GHz Metro Area Network

Cost Factors	
Infrastructure Cost per square mile	$ 250,000
Access Points per square mile	10
Cost per Access Point	$ 25,000

Jurisdiction	Population	Area	Access Points	Infrastructure Cost Estimate	Cost per Capita
Salinas	156,500	19.00 sq. mi.	190	$ 4,750,000	$ 30.35
Seaside	32,100	8.80 sq. mi.	88	$ 2,200,000	$ 68.54
Monterey	29,700	8.62 sq. mi.	86	$ 2,155,000	$ 72.56
Marina	25,300	8.70 sq. mi.	87	$ 2,175,000	$ 85.97
Soledad	22,450	4.20 sq. mi.	42	$ 1,050,000	$ 46.77
Pacific Grove	15,550	2.90 sq. mi.	29	$ 725,000	$ 46.62
Greenfield	12,850	1.70 sq. mi.	17	$ 425,000	$ 33.07
King City	11,350	3.70 sq. mi.	37	$ 925,000	$ 81.50
Gonzales	7,950	1.40 sq. mi.	14	$ 350,000	$ 44.03
Carmel Valley	4,700	19.10 sq. mi.	191	$ 4,775,000	$ 1,015.96
Pebble Beach	4,531	10.60 sq. mi.	106	$ 2,650,000	$ 584.86
Carmel-by-the-Sea	4,090	1.10 sq. mi.	11	$ 275,000	$ 67.24
Del Rey Oaks	1,650	0.50 sq. mi.	5	$ 125,000	$ 75.76
Sand City	270	0.60 sq. mi.	6	$ 150,000	$ 555.56
Big Sur	1,400				
Unincorporated	91,000				
	421,391	91 sq. mi.	909	$ 22,730,000	
Monterey County	420,000	3,324 sq. mi.	33,240	$ 831,000,000	$ 1,978.57

Notes

Infrastructure costs include exterior installation, non-UPS power (e.g., streetlights).
Configuration contemplates combination of wired and mesh access points.
Assumes existing WAN backbone connectivity for wired access points.

As the costs for comprehensive (border to border) coverage are so high, each community should selectively target those areas where utilization would be greatest.

SECTION 4
ORGANIZATIONAL ISSUES

This Section considers whether the voice and data upgrade projects should be separate projects or a combined project; whether the public safety and non-public safety projects should be separate or combined; and the alternatives for organizational structures for an extended regional approach to management and operation of radio systems in the County.

4.1 VOICE AND DATA PROJECTS

The voice system users will share a common fixed infrastructure and use generally equivalent system resources on a per-subscriber-unit basis. However, not all of the voice users will use the 800 MHz data system. Also, the 800 MHz data system users may use different "baskets" of services, such as dispatch communications but not automatic vehicle location. It is likely, therefore, that the initial implementation and ongoing operating cost allocation formulas will differ between the users of voice and data services, and possibly even for different categories of data users. Due to the differences in technology providers, the primary implementation contractors may be the same or different for each project.

Otherwise, however, the voice and 800 MHz data implementation projects have many points of commonality. They will likely use the same radio sites and same backbone infrastructure (i.e., wide area network connectivity). They will necessarily move forward under a coordinated schedule, and draw from the same pool of County and agency management, as well as local technical and operational resources. The same user and supervisory personnel will have to be trained for both the voice and data systems.

The consultants believe that combining the projects would best leverage project management, contract administration, and infrastructure preparation, subsequently achieving cost and schedule efficiencies. The consultants therefore recommend that the voice and 800 MHz data projects be combined. We further recommend that the County establish guidelines to ensure compatibility of the municipal broadband 4.9 GHz systems, but that the implementation and ongoing support of these individual broadband data systems would be the responsibility of the respective jurisdictions.

4.2 PUBLIC SAFETY AND NON-PUBLIC SAFETY PROJECTS

As discussed in prior sections, if the County were to stay with a conventional system architecture or upgrade only to simulcast there would be little incentive to include non-public agencies in the project. The public safety system equipment would be largely independent of the non-public safety system equipment, and there would be few economies of scale beyond bulk purchasing discounts. Further, the two categories of users would likely have different priorities and their funding sources would probably be different.

With the recommended trunked system design, however, the non-public safety agencies would share all of the common physical infrastructure with the public safety agencies. As each new

user joins the system, the cost allocation to each of the other users would decrease. The consultants therefore recommended that as many non-public safety user agencies as possible be encouraged to participate in the system.

Given the proposed joint use of the system, the desirability of coordinating equipment purchases, training, testing, etc., and the benefits of consolidated project management, administration and support, the clear recommendation is to combine the public safety and non-public safety implementations into a single project.

4.3 REGIONAL ORGANIZATION

Acceptance of the previously discussed recommendations will result in a project to implement a combined voice and data communications system serving both public safety and non-public safety users. In evaluating potential alternative organizational structures for management and operation of the system the consultants considered:

- Challenges to be met by the proposed project organization, such as orientation to particular goals; schedules and life cycles; interpersonal relations; formality of structure; and political mandates

- Analysis of activities to be performed and potential mission statements.

- Alternative organizational design methodologies, including classical management principles of Drucker, Baldridge and others.

- Performance measures and strategies, such as a Balanced Scorecard approach.

- Best practices, such as the SAFECOM program interoperability continuum and governance recommendations.

- Existing models of governance structures for similar systems in other regions and States.

The outcome of this analysis was a set of four alternatives for a Monterey County Next-Generation radio system governance structure. The alternatives considered were:

1. **Independent Agencies** operating interconnected subsystems under a Memorandum of Agreement.

2. A **Lead Agency** providing communications services to subscriber agencies.

3. A **Regional** organization operating under a consortium agreement or joint powers agreement, with shared ownership of the system infrastructure.

4. A **Regional/SEIC** approach with regional planning coordinated with a State Emergency Interoperability Committee (SEIC).

Exhibit 4-1 summarizes the evaluation of these four alternatives against a list of key criteria.

EXHIBIT 4-1
ORGANIZATIONAL ALTERNATIVES MATRIX

	Independent Agencies	Lead Agency	Regional	Regional w/SIEC
Clarity of Vision	Divergent	Single Vision	Combined Vision	Compromise
Economy	Higher individual costs	Benefits lead agency	Best opportunity for shared costs	Best opportunity for shared infrastructure
Direction of Vision/Activities	Additional coordination required	Clear Direction, Control	Clear Direction, Control	Combined, Extended Direction
Understanding of Tasks	Varies	Well Understood	Well Understood	Incomplete Information
Decision Making	Distributed	Centralized	Consensus	Protracted Consensus
Organizational Stability, Adaptability	Fixed	Stable	Stable	Regionally stable, numerous other entities
Perpetuation, Self-Renewal	Uncertain	Constrained	Uncertain	Unknown

A consensus of the Task Force emerged favoring a hybrid alternative combining elements of the Lead Agency and Regional organizational alternatives. A User Advisory Committee would report to the County Board of Supervisors. The Committee would oversee the activities of the County 9-1-1 Dispatch Department in managing the dispatch center, and the County Information Technology Department Telecommunications Section in managing the deployment of radio telecommunications infrastructure.

SECTION 5
FUNDING SOURCES

This Section provides an overview of alternative funding strategies associated with the infrastructure enhancements required to address the requirements outlined in the preceding sections of this report. This Section reviews the current funding environment in the County, summarizes federal programs and potential regional initiatives, and provides preliminary considerations and suggested near-term activities to prepare for a coordinated program of funding source development.

5.1 CURRENT FUNDING ENVIRONMENT

Very little information was available to identify or estimate the costs of operating the current voice and data radio systems. However, the following information that was available or could be estimated is suggestive of the overall order of magnitude of existing system costs and revenues

Current Asset Value – this value is an estimate of the equipment cost of the existing fixed infrastructure, as well as the current subscriber equipment counts.

Fixed Infrastructure		$ 2,900,000 - $ 4,700,000
Subscriber Equipment		8,200,000 - 11,000,000
	Total	$11,100,000 - $15,700,000

Direct Replacement Cost – this value represents the replacement cost of the existing systems using the current architecture. It does not consider additional channels or coverage, but does include estimates for design, engineering and installation services.

Add design, engineering, installation @ 15% - 30%	$13,000,000 - $20,000,000

Maintenance and Support Annual Costs – these amounts were derived from current County Information Technology budgets and represent the cost of maintaining the existing radio systems. However, not all agencies contract with the County Radio Shop for maintenance.

Monterey County Communications	
Radio Shop	$934,021
Other Agencies	
Radio Shop Services	$247,914
IT Network Connections	$ 57,210
Site Leases	$ 42,440
IT Labor	$ 9,746

Monterey County Communications Annual Revenues – these amounts represent annual revenues received from agencies for maintenance services.

Radio Shop	$449,152
Site Leases (9 sites)	23,211
Total	$472,363

5.2 FUNDING ALTERNATIVES

Described below are key Federal grant programs with purpose areas consistent with the objectives of the Monterey County project. The list is not intended to offer a comprehensive overview of Federal funding programs, but rather to target key programs for detailed evaluation as part of a strategic funding plan. Additional programs particularly relevant to emerging technologies and interoperability may be evaluated to determine potential funding relevance once technical strategies of the project are finalized.

Due to the timing of this deliverable within the Federal budget cycle, Fiscal Year (FY) 2006 appropriations and potential program combinations and re-alignments have not been finalized. While numerous funding programs support communications infrastructure and interoperability initiatives, it is important to note that no single program, particularly those offering formula-based or competitive awards, should be anticipated to provide the total funding required for system implementation and support.

In addition to Federal funding programs, this Section also examines several types of regional initiatives for consideration and evaluation based on community demographic and the final profile of funding needs.

Federal Grant Programs

Federal funding programs all rely on the authorization and appropriation processes inherent to the annual budget process, but depending on the type of grant and distribution methodology, the application from a local agency or regional consortium may be submitted to the granting Federal agency, a State agency, regional working group or congressional representative.

Federal funding may be passed directly to state or local or local agencies or to State Administering Agencies (SAAs) for distribution. Programs passing funds to States for distribution typically specify a percentage of the allocated amount, often 20%, that may be retained for State-level initiatives and grant administration. While often unpopular among local agencies, this strategy is favored by Federal grantees as it limits contact points to just the SAAs rather than each local grantee, and allows States to ensure funded projects support Statewide and regional priorities.

Funding distribution methodologies at both the Federal and State level comprise three formats:

Formula Funding. Formula-based distributions are based on data determined by the funding agencies and applied unilaterally. Formulas may comprise a combination of a minimum per-recipient amount, population, crime statistics and vulnerability assessment, as well as other factors. Receipt of formula-based funding generally requires an application that documents statistical information and establishes a budget for how funds will be spent.

Competitive Grants. Competitive grants require applicants to submit proposals to document the viability and 'fundability' of an envisioned project. Application procedures typically specify a structured proposal format detailing community need, project scope, budget, implementation plan, and benefits to be derived from successful completion of the proposed initiative, along with proposed performance measures. Proposals are scored based on published criteria and funded primarily on the outcome of the scoring process. The likelihood of receiving a competitive award depends on the amount of available funding, number of applications received, relevance of the proposed project to the funding program goals and, often, political support engendered for the proposed project.

Earmarks. Earmarks, or discretionary legislative spending, are the least structured and most individual method for distributing Federal funding. Earmarks are secured through requests of Congressional Representatives to their respective Appropriations Committee members to encumber a funding program in the amount of a desired local project.

Funding for the majority of public safety grant programs is provided through two of the 13 appropriations bills passed by Congress and enacted into public law each year. Highlights of the two relevant bills, H.R. 2862 Commerce-Justice-State (C-J-S) and H. R. 2360 the Department of Homeland Security (DHS), are presented below.

H. R. 2862 (Commerce-Justice-State)

H. R. 2862, the Commerce-Justice-State appropriations bill, includes the Department of Justice Appropriations Act, which makes appropriations for general administration, including for Department information sharing technology, conversion to narrowband and the Office of Justice Programs. Two key C-J-S programs of potential relevance to the Monterey County are the Justice Assistance Grant (JAG) program and Community-Oriented Policing Services (COPS) program. In FY 2005, these two primary law enforcement assistance programs received $1.24 billion. In FY 2006, they will receive $894.8 million, a 27.8 percent decrease. The FY 2006 appropriations bill continues a steady decline in funding levels for these programs in recent years. The JAG and COPS programs are described below.

H. R. 2360 (Department of Homeland Security)

The FY 2006 DHS appropriations bill, H. R. 2360, encompasses a broad range of funding programs and DHS restructuring realignments. The bill provides $1.715 billion for the three primary assistance programs from which agencies are eligible to obtain funds: the State Homeland Security Grant (SHGP) Program, the Law Enforcement Terrorism Prevention Program (LETPP) and the Urban Area Security Initiative (UASI). This figure

is down more than 28 percent from FY 2005 and 44 percent from FY 2004. These programs are described below.

The DHS appropriation legislation also revises the process of awarding Office of Domestic Preparedness (ODP) grants to States and local units of government, focusing this year on a formula comprising a base amount plus a terrorism risk factor. This formula structure is a major departure from past years, in which the ODP formula comprised a base amount plus population. The final conference report allows numerous entities, including port authorities, rail and transit providers, water districts, planning commissions and independent authorities, to qualify as "local units of government" for purposes of funding qualification.

In combination, the FY 2006 funding level for Department of Justice and Department of Homeland Security assistance programs is $2.610 billion, a reduction of 28 percent from the combined FY 2005 level and 44 percent from the combined FY 2004 level.

Briefly described below are several established funding programs with purpose areas synergistic to Monterey County needs and historical precedence of funding projects similar to the current project.

Urban Area Security Initiative (UASI). UASI is a formula program distributed to pre-selected high threat urban areas (50 largest cities) to address unique equipment, training, planning and exercise needs and to assist those areas in building an enhanced and sustainable capacity to prevent, respond to and recover from threats of acts of terrorism. The closest designated urban area to Monterey County is San Jose. While Monterey County is not currently eligible to receive UASI funding, this program is noted for two reasons: 1) at a recent regional UASI meeting, the potential of re-defining UASI boundaries and requiring revised Urban Area Homeland Security Strategies was presented, and 2) Santa Clara area's Silicon Valley Regional Interoperability Project (SVRIP) second amended Joint Funding Agreement recites, "WHEREAS the Network Participants also desire to integrate the SVRIP network solution(s) with other regions throughout the Bay area…" While an increase in UASI funding to cover all anticipated costs is incomprehensible, the synergies of these two concepts should be explored.

State Homeland Security Grant Program (SHSGP). The State Homeland Security Grant Program, administered by the Office of Justice Programs within the Department of Homeland Security, provides homeland security assistance funds to States to prevent, respond to and recover from terrorist attacks. SHSGP funding is intended to address State homeland security planning, equipment , training and exercise needs as defined in local plans rolled up into each State's documented Homeland Security Strategy. Beginning in FY 2006, SHSGP funds will be distributed to States based on a base plus terrorism risk formula, with each State receiving a minimum of .75% of the total program funding and 62% distributed at the discretion of DHS based on risk. The SHSGP program is funded at $550 million for FY 2006, down from $1.1 billion in FY 2005 and $1.7 billion in FY 2004. The impact of the decreased allocation and new distribution formula on State and corresponding local grant amounts is currently being assessed. States are required to distribute 80 % of awarded funds to local governments.

The State Homeland Security Grant Program supports not only law enforcement, but rather a wide range of public safety agencies responsible for preparing for and/or responding to terrorist attacks. Local SHSGP allocations are distributed through a five member administering team representing all public safety disciplines responsible for jointly establishing local priorities and coordinating with the State Administering Agency. While acknowledging the reality of competing priorities, some portion of local SHSGP funding might be directed to Monterey County expenditures.

Deadlines for States to submit their SHSGP applications to the Department of Homeland Security are traditionally mid-quarter of the calendar year. Corresponding deadlines for local working groups to submit their respective applications to their State Administering Agencies vary.

Law Enforcement Terrorism Prevention Program (LETPP). The Law Enforcement Terrorism Prevention Program is the result of a concerted effort to increase the level of funding available to the law enforcement community for terrorism prevention efforts at the local level. LETPP is funded at $400 million for FY 2006, an amount equal to the FY 2005 allocation. The Law Enforcement Terrorism Prevention Program, one of six separate Office of Domestic Preparedness programs merged into the Homeland Security Grant Program in FY 2005, assists law enforcement agencies in conducting terrorism prevention activities, including, among others, information sharing to preempt terrorist attacks and interoperable communications. Within these focus areas, funds can be used for equipment, planning, organization, training and exercises.

Assuming Monterey County receives a portion of the State of California's allocation, LETPP funds could be allocated to expenditures. State deadlines to submit LETPP applications are typically mid-January of the calendar year. Local applications to their State Administering Agencies vary but precede State deadlines.

Justice Assistance Grant (JAG) Program. The JAG program, administered by the Bureau of Justice Assistance, was established in FY 2005 by combining the Local Law Enforcement Block Grant Program (LLEBG) and Byrne Formula Program. JAG emphasizes local decision making through six purpose areas, including planning, evaluation and technology improvement programs. JAG funds are allocated based on a formula derived from population and crime statistics, with an approximate 60%/40% distribution between state and local recipients. Any initiative or acquisition funded under either LLEBG or Byrne is eligible for JAG funding, including portable radios and mobile data terminals. The JAG program will receive $416.5 million in FY 2006, a 34 percent decrease from FY 2005 and a 53 percent decrease from FY 2004. In addition, the bill further reduces the amount available to agencies by earmarking $85 million for Boys and Girls Clubs. In FY2004, the last year of separate LLEBG allocations, the cities of Monterey, Salinas and Seaside collectively drew down nearly $145,000. While this sum is small relative to anticipated funding requirements, the consultants suggest that -related purchases be considered.

Assistance to Firefighters Grant Program (AFGP). The Assistance to Firefighters Grant Program, administered by the U.S. Fire Administration through the Federal Emergency Management Agency (FEMA), is a broadly-based competitive grant program serving as the predominant source of funding for local fire department needs. Among allowable AFGP expenditures are portable radios, mobile communications equipment, including mobile repeaters, mobile data systems and integrated communications systems such as base stations, fixed-site repeaters and wireless and broadband mobile data systems intended to solve interoperability problems. Applications may be submitted by individual agencies or regional consortia. Matching requirements and award limits are based on population served. Applications seeking funding for interoperable communications equipment must provide narrative regarding the local plan to ensure or achieve interoperability. Using the Strategic Plan as a foundation, development and submission of a regional application to include participating fire agencies' proportional share of allowable expenditures should be explored.

The AFGP online application period typically falls late in the first quarter of the calendar year.

Community Oriented Policing Services (COPS) Interoperable Communications Technology Grant Program. The COPS Interoperable Communications Technology Grant Program invites selected jurisdictions to apply for funding to develop interoperable communications networks. The grants offset the cost of purchasing voice and data communications equipment, enhancing communications infrastructures and project management, and focus on regional collaboration among law enforcement, fire service and emergency medical service agencies. The FY 2005 program invited the 50 largest Metropolitan Statistical Areas (MSAs) and largest three MSAs per State and territory. Overlapping areas were eliminated, as well as jurisdictions funded through the Program in FY2003 and FY2004. Recipients are required to provide a 25% match of the Federal funds, up to a maximum of $6 million.

The COPS Office received $129 million to support interoperability in FY 2006, all of which is reportedly earmarked, along with $10 million in discretionary funding. As of the first week of January, the approach for best leveraging this discretionary funding has not been determined.

As a result of conversations with the COPS Program Office, the consultants suggest a detailed review of the successful FY2005 applications to get a sense of the concepts and level of detail required for award.

Commercial Equipment Direct Assistance Program (CEDAP). The Commercial Equipment Direct Assistance Program (CEDAP) is sponsored by the DHS Office of State and Local Government Coordination & Preparedness (SLGCP). It is designed to assist smaller communities, including selected small and rural jurisdictions and other areas not funded under UASI, in acquiring and using commercially available equipment to prevent, deter, and respond to terrorist attacks, as identified in state homeland security strategies.

CEDAP, a competitive program, provides direct assistance, not monetary grants. SLGCP will provide the equipment and technical assistance directly to the selected jurisdictions. The program includes, but is not limited to, interoperable communications equipment, defensive protective equipment for first responders, and vulnerability assessment equipment based on a detailed equipment catalog. CEDAP is funded at $50 million for FY 2006.

Determination of eligibility and program registration is required. The CEDAP application period opened November 7, 2005 and closed on January 13, 2006.

Regional Initiatives

While Federal funding program offer potential opportunities to fund New Generation Radio Project requirements, the anticipated project costs strongly suggest the need to identify a significant portion of the funding at the regional level. Several potential strategies are noted below. Each requires careful examination and discussion to gauge feasibility, community acceptance and the amount of funding that might be generated.

Congressional Earmark/Directed Funding. Monterey County has directly benefited from Congressional funding sponsored by Senator Barbara Boxer and Representative Sam Farr. While prior earmarks have targeted anti-gang task force efforts and not communications initiatives, the success of this endeavor demonstrates the County's ability and commitment to expend funds diligently and to generate demonstrable results. The Congressional earmark process is time-consuming and exacting, requiring documentation of a clearly defensible project, the success of which will result in positive results for the community of interest and favorable exposure to the sponsoring legislators, as well as dedicated "face time" with legislative staff, local leaders and, potentially, strong lobbyists. The consultants suggest a key component of a comprehensive fund seeking strategy should be preparation of a detailed Congressional Earmark request and supporting activities for the FY 2007 Congressional session.

Municipal Bonds. Municipal bonds are issued by cities and local governments to raise capital, often for local infrastructure projects such as the current project initiative. The two common types of municipal bonds are General Obligation Bonds and Revenue Bonds.

General Obligation Bonds are unsecured municipal bonds legally backed by the full faith and credit of the issuing government, which is legally obligated to use its full taxing power, if necessary, to repay the debt. General obligation bonds typically have maturities of at least ten years and are paid off with funds from taxes or other fees.

General obligation bonds may be self-supporting, or not self-supporting. If the use of the proceeds from a bond issue provides a revenue stream that can be used for repaying the debt, the bonds are self-supporting. Conversely, if no revenue

stream results from the use of the general obligation bond proceeds, the bonds are not self-supporting and must be financed with general revenues.

The potential use of general obligation bonds carries advantages and disadvantages, all of which must be carefully evaluated by Monterey County and project stakeholders. General obligation bonds have the advantage that they typically sell at the lowest interest rates since they are considered to be low risk, and since general obligation bonds are less complex than revenue bonds, administrative costs may be lower. In addition, the passage of a bond referendum by voters confirms popular support for the project being financed. However, a primary disadvantage to the use of general obligation bonds is the time required for voter referendum. If voters do not approve the bonds, the project is at risk until another funding mechanism is identified. Additionally, the ability to issue general obligation bonds may be constrained by legal debt limits or existing debt service requirements on previously issued bonds.

Revenue Bonds, somewhat similarly to self-supporting general obligation bonds, are used to fund projects that will eventually create revenue directly, such as a toll road or lease payments on a new building. The revenues from the project are subsequently used to pay off the bonds. In the case of the current project, if the communications infrastructure installed using bond proceeds were planned with excess capacity that could be leased, the stream of revenue could be used to support the debt service.

Mill Rate Increase. Mill rate increases refer to incremental increase in property taxes enacted to generate funding for day-to-day activities or special projects in the area to benefit from the increase. Mill rate increases may be for a defined duration or indefinite and require voter approval. Governmental entities examining the feasibility of a mill rate increase typically undertake a detailed community assessment to determine not only the level of funding that might be generated, but also voter sentiment and likelihood of approval. Any consideration of a mill rate increase to support project activities must consider sustainment funding as well as implementation requirements.

Local Government Fees and Assessment Funds. Local government fees may be imposed by governmental entities to have local residents help subsidize operating costs of essential services. Santa Cruz, for example, recently enacted a $3.50 per month local government fee to fund ongoing costs of the regional emergency communications center. The fee is assessed per telephone line. Fees for essential services, while not politically popular, are often balanced against shrinking budgets due to State funding cuts and the need to preserve public safety infrastructure and services. Local government fees are typically approved by a City Council or Board of Supervisors rather than voter referendum. In the case of the current project, local government fees might prove viable as part of a ‘sustainment’ strategy, but may not generate sufficient revenues to fund system capital costs.

Somewhat similar to local government fees, assessment funds are used to cover the costs of establishing, improving and/or maintaining a particular municipal service, such as street lighting, in a special district that directly benefits from the assessment. Assessments are typically billed by the County on annual property tax bills.

5.3 FUNDING RECOMMENDATIONS

The technical complexity and anticipated costs to successfully implement and support a fully interoperable new generation voice and data communications infrastructure demand a dedicated and coordinated approach to funding considerations. To maximize opportunities for long-term funding success and resulting system viability, the consultants recommend the following near-term activities and considerations:

1. **Establish Formal Governance Structure –** A key component to a regional effort of the magnitude of the Monterey County Operational Area Emergency Communications System project is a solid governance structure to guide collaborative efforts relating to fund seeking, acquisition, implementation and sustainment. From the funding perspective, a formal, documented governance structure will be an essential element to any application, political appeal or regional assessment effort. The consultants suggest an initial step of establishing a governance structure specific to Project. At a minimum, the governance structure must define the following:

    - Charter (Mission Statement)
    - Scope of Authority
    - Board of Directors
    - Key Committees, each chaired by a member of the Board of Directors.
        - Recommended committees include Executive, Technical, Oversight, Security, Evaluation and Funding.
    - Operational Rules
    - Entry/Exit Mechanisms
    - Cost Sharing Strategy
    - Decision Making Process

    To ensure success, the governance structure must, through its various committees and policies, emphasize continuous and direct communication among all project stakeholders and actively involve end users in design and implementation activities.

2. **Develop Comprehensive Fund Seeking Strategy – A**s described previously, a variety of mechanisms may be suitable to Monterey County's funding needs. Due to the anticipated magnitude of the funding required, it is unlikely that any single funding source, with possible exception of a bonding initiative, will generate sufficient funds to address all project requirements. As such, development of a comprehensive fund seeking strategy should be tasked to the Funding Committee. Understanding that finalizing a formal governance structure may be a somewhat time-

consuming process, and that large-scale funding initiatives may be tied to legislative processes and sessions, the consultants suggest the immediate creation of the Funding Committee for purposes of developing a comprehensive fund seeking strategy. The strategy should assume a hybrid funding approach, examining in detail the feasibility and likelihood of success relating to activities such as local bonding, surcharges and/or mill rate increases, and identifying requirements, timeframes and resources for pursuing Congressional earmarks in the FY2007 budget. As part of the strategy, the Funding Committee should immediately begin review of the COPS Interoperability project applications that were recently awarded funding to understand application dynamics and the project elements common to the funded initiatives.

The envisioned hybrid fund seeking strategy should consider primary and secondary approaches for each element of the plan so as to ensure continued project momentum if delays or denials of one or more funding mechanism are encountered. The use of lobbyists, consultants and vendor personnel to aid in execution of the fund seeking strategy may be considered.

3. **Consider Expanded Regionalization –** Perhaps the most widely and broadly defined term in the public safety lexicon is "interoperability". The inability of first responders to communicate effectively across agency boundaries is common and well understood, if not easily remedied. From a funding perspective, regionalization is a critical concept, for regional initiatives, if properly designed and implemented, maximize interoperability opportunities while potentially minimizing per unit costs. As such, funding of regional initiatives and demonstration projects is much more likely and politically popular than funding of relative standalone efforts. While Monterey County comprises a significant geographic area, expanded regionalization to include the San Benito and Santa Cruz Counties and to potentially leverage the Santa Clara County microwave site in Monterey County should be considered. This is not to suggest expanding the Radio Project to incorporate additional counties in any initial technical deployment, but rather to collaboratively identify a phased approach to expanded regionalization that presents a forward-thinking roadmap for potential funding applications and documentation.

4. **Identify a System Sustainment Strategy –** To insure long-term success of the Project, a sustainment strategy for managing ongoing costs of maintenance, upgrades and eventual migration to future technologies is essential. In addition to providing a solid foundation for the new system, a documented sustainment strategy will important to demonstrate fiscal responsibility and long-term project viability to potential funding sources.

APPENDICES

Appendix A - Agency Cost Estimates

This Appendix documents the cost estimate calculations for individual agency subscriber equipment, shared infrastructure, and site remediation, under the following assumptions:

- All fixed infrastructure becomes 'consortium' owned and administered.
- Purchase of trunking compatible base stations and subscriber equipment so that fixed infrastructure upgrades can be migrated to trunking.
- In-building coverage enhancements (Salinas Police Department, others) will require further identification and enumeration of specific facilities to support cost estimates.
- High-end radios assume purchased with encryption (i.e., purchase of programming feature/capability).
- High-end radios for police, fire, probation, district attorney agencies; all others are mid-range.

Exhibit A1 on the next page documents the individual agency allocation percentages used in calculation of the individual agency costs. Each agency's allocation percentage is calculated by dividing the total of the agency's mobile radios plus portable radios by the total of all mobile and portable radios in all of the participating agencies.

Exhibit A2 summarizes mobile and portable unit costs, fixed infrastructure implementation base costs, and maintenance costs used in calculation of the individual agency costs.

The remainder of the Appendix provides cost summary sheets for each participating agency.

EXHIBIT A1

COST ALLOCATION SUMMARY

Agency	High-End Mobiles	High-End Portables	Mid-Range Mobiles	Mid-Range Portables	Total	Percentage
Law Enforcement Agencies						
Carmel Police Department	8	15			23	0.829%
CSU Monterey Bay Police Department	7	23			30	1.081%
Del Rey Oaks Police Department *						
Fort Hunter Liggett Police Department *						
Gonzales Police Department	11	25			36	1.298%
Greenfield Police Department	11	32			43	1.550%
King City Police Department	10	18			28	1.009%
Marina Public Safety - Patrol Division	25	15			40	1.442%
Monterey Airport Police Department	4	11			15	0.541%
Monterey City Police Department	23	25			48	1.730%
Monterey County District Attorney	38	12			50	1.802%
Monterey County Parks Rangers	19	22			41	1.478%
Monterey County Probation	16	98			114	4.110%
Monterey County Sheriff	192	551			743	26.784%
Pacific Grove Police Department	8	36			44	1.586%
Presidio Police Department *						
Salinas Police Department	79	214			293	10.562%
Sand City Police Department	6	16			22	0.793%
Seaside Police Department	28	39			67	2.415%
Soledad Correctional Training Facility	7	5			12	0.433%
Soledad Police Department	7	16			23	0.829%
Fire Agencies						
Aromas Fire *						
Big Sur Volunteer Fire Brigade	12	34			46	1.658%
Cachagua Fire District *						
Carmel City Fire Department	13	36			49	1.766%
Carmel Highlands Fire Protection District *						
Carmel Valley Fire	32	52			84	3.028%
Cypress Fire Protection District *						
Gonzales Fire Department	9	21			30	1.081%
Greenfield Fire Protection District	7	18			25	0.901%
King City Fire Department	9	15			24	0.865%
Marina Public Safety - Fire Division	13	20			33	1.190%
Mid Coast Volunteer Fire *						
Monterey Airport Fire Department	7	22			29	1.045%
Monterey City Fire Department	13	42			55	1.983%
North County Fire Protection District	22	45			67	2.415%
Pacific Grove Fire Department	13	27			40	1.442%
Pebble Beach Fire Department *						
Presidio Fire Department *						
Salinas Fire Department	33	81			114	4.110%
Salinas Rural Fire Protection District	21	36			57	2.055%
San Ardo Volunteer Fire *						
Seaside Fire Department	13	40			53	1.911%
Soledad Fire Department	7	8			15	0.541%
South Monterey County Fire *						
Spreckels Volunteer Fire Company	2	11			13	0.469%
Monterey County EMS	20	0			20	0.721%
Non-Public Safety Agencies						
Monterey City Conference Center				13	13	0.469%
Monterey City Harbor/Marina			6	5	11	0.397%
Monterey City Information Services				10	10	0.360%
Monterey City Off-Street Parking				8	8	0.288%
Monterey City Parking Enforcement			9	16	25	0.901%
Monterey City Parking Maintenance			4	4	8	0.288%
Monterey City Recreation Services				10	10	0.360%
Monterey County Public Works			92	68	160	5.768%
Salinas Maintenance Services			103		103	3.713%
City of Carmel **						
City of Del Rey Oaks **						
City of Greenfield **						
City of Gonzales **						
City of King City **						
City of Marina **						
City of Pacific Grove **						
City of Sand City **						
City of Seaside **						
City of Soledad **						
Total	745	1681	214	134	2774	100.000%

Notes:

Above numbers may change as more accurate inventory data becomes available and/or more agencies participate.
* Indicates agency not currently participating in the shared voice radio system project.
** Indicates no inventory data available for cost allocation.

EXHIBIT A2

UNIT AND BASE COST ASSUMPTIONS

Cost Factor	Low	-	High
Mobile Radios - High End	$ 4,500	-	$ 5,500
Portable Radios - High End	$ 3,500	-	$ 5,000
Mobile Radios - Mid Range	$ 2,000	-	$ 2,500
Portable Radios - Mid Range	$ 2,000	-	$ 2,500
Engineering Study	$ 368,250	-	$ 466,850
Trunked System Fixed Equipment	$ 3,750,000	-	$ 4,950,000
Trunked System Implementation Services	$ 1,125,000	-	$ 1,485,000
Site Remediation	$ 2,490,000	-	$ 2,902,000
Annual Maintenance, % of Mobile/Portable Cost	7%		
Equipment Replacement at End of Life Cycle	100%		

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

CARMEL POLICE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	8		$ 4,500	-	$ 5,500		$36,000	-	$44,000
Portable Radios - High End	15		$ 3,500	-	$ 5,000		$52,500	-	$75,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$88,500	-	$119,000
Shared Costs									
Engineering Study	0.829%		$ 368,250	-	$ 466,850		$3,053	-	$3,871
Trunked System Fixed Equipment	0.829%		$ 3,750,000	-	$ 4,950,000		$31,092	-	$41,042
Trunked System Implementation Services	0.829%		$ 1,125,000	-	$ 1,485,000		$9,328	-	$12,313
Site Remediation	0.829%		$ 2,490,000	-	$ 2,902,000		$20,645	-	$24,061
Subtotal							$64,119	-	$81,286
Total Initial Costs							**$152,619**	-	**$200,286**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$88,500	-	$119,000		$6,195	-	$8,330
Year 2 Equipment Maintenance	7%		$88,500	-	$119,000		$6,195	-	$8,330
Year 3 Equipment Maintenance	7%		$88,500	-	$119,000		$6,195	-	$8,330
Year 4 Equipment Maintenance	7%		$88,500	-	$119,000		$6,195	-	$8,330
Year 5 Equipment Maintenance	7%		$88,500	-	$119,000		$6,195	-	$8,330
Year 6 Equipment Maintenance	7%		$88,500	-	$119,000		$6,195	-	$8,330
Year 7 Equipment Maintenance	7%		$88,500	-	$119,000		$6,195	-	$8,330
Year 8 Equipment Maintenance	7%		$88,500	-	$119,000		$6,195	-	$8,330
Year 9 Equipment Maintenance	7%		$88,500	-	$119,000		$6,195	-	$8,330
Year 10 Equipment Maintenance	7%		$88,500	-	$119,000		$6,195	-	$8,330
Life Cycle Equipment Replacement	100%		$88,500	-	$119,000		$88,500	-	$119,000
Total Maintenance/Replacement							**$150,450**	**-**	**$202,300**
TOTAL 10-YEAR COST							**$303,069**	**-**	**$402,586**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

CSU MONTEREY BAY POLICE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	7		$ 4,500	-	$ 5,500		$31,500	-	$38,500
Portable Radios - High End	23		$ 3,500	-	$ 5,000		$80,500	-	$115,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$112,000	-	$153,500
Shared Costs									
Engineering Study	1.081%		$ 368,250	-	$ 466,850		$3,983	-	$5,049
Trunked System Fixed Equipment	1.081%		$ 3,750,000	-	$ 4,950,000		$40,555	-	$53,533
Trunked System Implementation Services	1.081%		$ 1,125,000	-	$ 1,485,000		$12,167	-	$16,060
Site Remediation	1.081%		$ 2,490,000	-	$ 2,902,000		$26,929	-	$31,384
Subtotal							$83,633	-	$106,026
Total Initial Costs							**$195,633**	-	**$259,526**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$112,000	-	$153,500		$7,840	-	$10,745
Year 2 Equipment Maintenance	7%		$112,000	-	$153,500		$7,840	-	$10,745
Year 3 Equipment Maintenance	7%		$112,000	-	$153,500		$7,840	-	$10,745
Year 4 Equipment Maintenance	7%		$112,000	-	$153,500		$7,840	-	$10,745
Year 5 Equipment Maintenance	7%		$112,000	-	$153,500		$7,840	-	$10,745
Year 6 Equipment Maintenance	7%		$112,000	-	$153,500		$7,840	-	$10,745
Year 7 Equipment Maintenance	7%		$112,000	-	$153,500		$7,840	-	$10,745
Year 8 Equipment Maintenance	7%		$112,000	-	$153,500		$7,840	-	$10,745
Year 9 Equipment Maintenance	7%		$112,000	-	$153,500		$7,840	-	$10,745
Year 10 Equipment Maintenance	7%		$112,000	-	$153,500		$7,840	-	$10,745
Life Cycle Equipment Replacement	100%		$112,000	-	$153,500		$112,000	-	$153,500
Total Maintenance/Replacement							**$190,400**	**-**	**$260,950**
TOTAL 10-YEAR COST							**$386,033**	**-**	**$520,476**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

GONZALES POLICE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	11		$ 4,500	-	$ 5,500		$49,500	-	$60,500
Portable Radios - High End	25		$ 3,500	-	$ 5,000		$87,500	-	$125,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$137,000	-	$185,500
Shared Costs									
Engineering Study	1.298%		$ 368,250	-	$ 466,850		$4,779	-	$6,059
Trunked System Fixed Equipment	1.298%		$ 3,750,000	-	$ 4,950,000		$48,666	-	$64,239
Trunked System Implementation Services	1.298%		$ 1,125,000	-	$ 1,485,000		$14,600	-	$19,272
Site Remediation	1.298%		$ 2,490,000	-	$ 2,902,000		$32,314	-	$37,661
Subtotal							$100,359	-	$127,231
Total Initial Costs							**$237,359**	-	**$312,731**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$137,000	-	$185,500		$9,590	-	$12,985
Year 2 Equipment Maintenance	7%		$137,000	-	$185,500		$9,590	-	$12,985
Year 3 Equipment Maintenance	7%		$137,000	-	$185,500		$9,590	-	$12,985
Year 4 Equipment Maintenance	7%		$137,000	-	$185,500		$9,590	-	$12,985
Year 5 Equipment Maintenance	7%		$137,000	-	$185,500		$9,590	-	$12,985
Year 6 Equipment Maintenance	7%		$137,000	-	$185,500		$9,590	-	$12,985
Year 7 Equipment Maintenance	7%		$137,000	-	$185,500		$9,590	-	$12,985
Year 8 Equipment Maintenance	7%		$137,000	-	$185,500		$9,590	-	$12,985
Year 9 Equipment Maintenance	7%		$137,000	-	$185,500		$9,590	-	$12,985
Year 10 Equipment Maintenance	7%		$137,000	-	$185,500		$9,590	-	$12,985
Life Cycle Equipment Replacement	100%		$137,000	-	$185,500		$137,000	-	$185,500
Total Maintenance/Replacement							**$232,900**	**-**	**$315,350**
TOTAL 10-YEAR COST							**$470,259**	**-**	**$628,081**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

GREENFIELD POLICE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	11		$ 4,500	-	$ 5,500		$49,500	-	$60,500
Portable Radios - High End	32		$ 3,500	-	$ 5,000		$112,000	-	$160,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$161,500	-	$220,500
Shared Costs									
Engineering Study	1.550%		$ 368,250	-	$ 466,850		$5,708	-	$7,237
Trunked System Fixed Equipment	1.550%		$ 3,750,000	-	$ 4,950,000		$58,129	-	$76,730
Trunked System Implementation Services	1.550%		$ 1,125,000	-	$ 1,485,000		$17,439	-	$23,019
Site Remediation	1.550%		$ 2,490,000	-	$ 2,902,000		$38,598	-	$44,984
Subtotal							$119,874	-	$151,970
Total Initial Costs							**$281,374**	-	**$372,470**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$161,500	-	$220,500		$11,305	-	$15,435
Year 2 Equipment Maintenance	7%		$161,500	-	$220,500		$11,305	-	$15,435
Year 3 Equipment Maintenance	7%		$161,500	-	$220,500		$11,305	-	$15,435
Year 4 Equipment Maintenance	7%		$161,500	-	$220,500		$11,305	-	$15,435
Year 5 Equipment Maintenance	7%		$161,500	-	$220,500		$11,305	-	$15,435
Year 6 Equipment Maintenance	7%		$161,500	-	$220,500		$11,305	-	$15,435
Year 7 Equipment Maintenance	7%		$161,500	-	$220,500		$11,305	-	$15,435
Year 8 Equipment Maintenance	7%		$161,500	-	$220,500		$11,305	-	$15,435
Year 9 Equipment Maintenance	7%		$161,500	-	$220,500		$11,305	-	$15,435
Year 10 Equipment Maintenance	7%		$161,500	-	$220,500		$11,305	-	$15,435
Life Cycle Equipment Replacement	100%		$161,500	-	$220,500		$161,500	-	$220,500
Total Maintenance/Replacement							**$274,550**	**-**	**$374,850**
TOTAL 10-YEAR COST							**$555,924**	**-**	**$747,320**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

KING CITY POLICE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	10		$ 4,500	-	$ 5,500		$45,000	-	$55,000
Portable Radios - High End	18		$ 3,500	-	$ 5,000		$63,000	-	$90,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$108,000	-	$145,000
Shared Costs									
Engineering Study	1.009%		$ 368,250	-	$ 466,850		$3,717	-	$4,712
Trunked System Fixed Equipment	1.009%		$ 3,750,000	-	$ 4,950,000		$37,851	-	$49,964
Trunked System Implementation Services	1.009%		$ 1,125,000	-	$ 1,485,000		$11,355	-	$14,989
Site Remediation	1.009%		$ 2,490,000	-	$ 2,902,000		$25,133	-	$29,292
Subtotal							$78,057	-	$98,957
Total Initial Costs							**$186,057**	-	**$243,957**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$108,000	-	$145,000		$7,560	-	$10,150
Year 2 Equipment Maintenance	7%		$108,000	-	$145,000		$7,560	-	$10,150
Year 3 Equipment Maintenance	7%		$108,000	-	$145,000		$7,560	-	$10,150
Year 4 Equipment Maintenance	7%		$108,000	-	$145,000		$7,560	-	$10,150
Year 5 Equipment Maintenance	7%		$108,000	-	$145,000		$7,560	-	$10,150
Year 6 Equipment Maintenance	7%		$108,000	-	$145,000		$7,560	-	$10,150
Year 7 Equipment Maintenance	7%		$108,000	-	$145,000		$7,560	-	$10,150
Year 8 Equipment Maintenance	7%		$108,000	-	$145,000		$7,560	-	$10,150
Year 9 Equipment Maintenance	7%		$108,000	-	$145,000		$7,560	-	$10,150
Year 10 Equipment Maintenance	7%		$108,000	-	$145,000		$7,560	-	$10,150
Life Cycle Equipment Replacement	100%		$108,000	-	$145,000		$108,000	-	$145,000
Total Maintenance/Replacement							**$183,600**	**-**	**$246,500**
TOTAL 10-YEAR COST							**$369,657**	**-**	**$490,457**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MARINA PUBLIC SAFETY - PATROL DIVISION

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	25		$ 4,500	-	$ 5,500		$112,500	-	$137,500
Portable Radios - High End	15		$ 3,500	-	$ 5,000		$52,500	-	$75,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$165,000	-	$212,500
Shared Costs									
Engineering Study	1.442%		$ 368,250	-	$ 466,850		$5,310	-	$6,732
Trunked System Fixed Equipment	1.442%		$ 3,750,000	-	$ 4,950,000		$54,074	-	$71,377
Trunked System Implementation Services	1.442%		$ 1,125,000	-	$ 1,485,000		$16,222	-	$21,413
Site Remediation	1.442%		$ 2,490,000	-	$ 2,902,000		$35,905	-	$41,846
Subtotal							$111,510	-	$141,368
Total Initial Costs							**$276,510**	-	**$353,868**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$165,000	-	$212,500		$11,550	-	$14,875
Year 2 Equipment Maintenance	7%		$165,000	-	$212,500		$11,550	-	$14,875
Year 3 Equipment Maintenance	7%		$165,000	-	$212,500		$11,550	-	$14,875
Year 4 Equipment Maintenance	7%		$165,000	-	$212,500		$11,550	-	$14,875
Year 5 Equipment Maintenance	7%		$165,000	-	$212,500		$11,550	-	$14,875
Year 6 Equipment Maintenance	7%		$165,000	-	$212,500		$11,550	-	$14,875
Year 7 Equipment Maintenance	7%		$165,000	-	$212,500		$11,550	-	$14,875
Year 8 Equipment Maintenance	7%		$165,000	-	$212,500		$11,550	-	$14,875
Year 9 Equipment Maintenance	7%		$165,000	-	$212,500		$11,550	-	$14,875
Year 10 Equipment Maintenance	7%		$165,000	-	$212,500		$11,550	-	$14,875
Life Cycle Equipment Replacement	100%		$165,000	-	$212,500		$165,000	-	$212,500
Total Maintenance/Replacement							**$280,500**	**-**	**$361,250**
TOTAL 10-YEAR COST							**$557,010**	**-**	**$715,118**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY AIRPORT POLICE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	4		$ 4,500	-	$ 5,500		$18,000	-	$22,000
Portable Radios - High End	11		$ 3,500	-	$ 5,000		$38,500	-	$55,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$56,500	-	$77,000
Shared Costs									
Engineering Study	0.541%		$ 368,250	-	$ 466,850		$1,991	-	$2,524
Trunked System Fixed Equipment	0.541%		$ 3,750,000	-	$ 4,950,000		$20,278	-	$26,766
Trunked System Implementation Services	0.541%		$ 1,125,000	-	$ 1,485,000		$6,083	-	$8,030
Site Remediation	0.541%		$ 2,490,000	-	$ 2,902,000		$13,464	-	$15,692
Subtotal							$41,816	-	$53,013
Total Initial Costs							**$98,316**	-	**$130,013**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$56,500	-	$77,000		$3,955	-	$5,390
Year 2 Equipment Maintenance	7%		$56,500	-	$77,000		$3,955	-	$5,390
Year 3 Equipment Maintenance	7%		$56,500	-	$77,000		$3,955	-	$5,390
Year 4 Equipment Maintenance	7%		$56,500	-	$77,000		$3,955	-	$5,390
Year 5 Equipment Maintenance	7%		$56,500	-	$77,000		$3,955	-	$5,390
Year 6 Equipment Maintenance	7%		$56,500	-	$77,000		$3,955	-	$5,390
Year 7 Equipment Maintenance	7%		$56,500	-	$77,000		$3,955	-	$5,390
Year 8 Equipment Maintenance	7%		$56,500	-	$77,000		$3,955	-	$5,390
Year 9 Equipment Maintenance	7%		$56,500	-	$77,000		$3,955	-	$5,390
Year 10 Equipment Maintenance	7%		$56,500	-	$77,000		$3,955	-	$5,390
Life Cycle Equipment Replacement	100%		$56,500	-	$77,000		$56,500	-	$77,000
Total Maintenance/Replacement							**$96,050**	**-**	**$130,900**
TOTAL 10-YEAR COST							**$194,366**	**-**	**$260,913**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY CITY POLICE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	23		$ 4,500	-	$ 5,500		$103,500	-	$126,500
Portable Radios - High End	25		$ 3,500	-	$ 5,000		$87,500	-	$125,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$191,000	-	$251,500
Shared Costs									
Engineering Study	1.730%		$ 368,250	-	$ 466,850		$6,372	-	$8,078
Trunked System Fixed Equipment	1.730%		$ 3,750,000	-	$ 4,950,000		$64,888	-	$85,652
Trunked System Implementation Services	1.730%		$ 1,125,000	-	$ 1,485,000		$19,466	-	$25,696
Site Remediation	1.730%		$ 2,490,000	-	$ 2,902,000		$43,086	-	$50,215
Subtotal							$133,813	-	$169,641
Total Initial Costs							**$324,813**	-	**$421,141**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$191,000	-	$251,500		$13,370	-	$17,605
Year 2 Equipment Maintenance	7%		$191,000	-	$251,500		$13,370	-	$17,605
Year 3 Equipment Maintenance	7%		$191,000	-	$251,500		$13,370	-	$17,605
Year 4 Equipment Maintenance	7%		$191,000	-	$251,500		$13,370	-	$17,605
Year 5 Equipment Maintenance	7%		$191,000	-	$251,500		$13,370	-	$17,605
Year 6 Equipment Maintenance	7%		$191,000	-	$251,500		$13,370	-	$17,605
Year 7 Equipment Maintenance	7%		$191,000	-	$251,500		$13,370	-	$17,605
Year 8 Equipment Maintenance	7%		$191,000	-	$251,500		$13,370	-	$17,605
Year 9 Equipment Maintenance	7%		$191,000	-	$251,500		$13,370	-	$17,605
Year 10 Equipment Maintenance	7%		$191,000	-	$251,500		$13,370	-	$17,605
Life Cycle Equipment Replacement	100%		$191,000	-	$251,500		$191,000	-	$251,500
Total Maintenance/Replacement							**$324,700**	**-**	**$427,550**
TOTAL 10-YEAR COST							**$649,513**	**-**	**$848,691**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY COUNTY DISTRICT ATTORNEY

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	38		$ 4,500	-	$ 5,500		$171,000	-	$209,000
Portable Radios - High End	12		$ 3,500	-	$ 5,000		$42,000	-	$60,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$213,000	-	$269,000
Shared Costs									
Engineering Study	1.802%		$ 368,250	-	$ 466,850		$6,638	-	$8,415
Trunked System Fixed Equipment	1.802%		$ 3,750,000	-	$ 4,950,000		$67,592	-	$89,221
Trunked System Implementation Services	1.802%		$ 1,125,000	-	$ 1,485,000		$20,278	-	$26,766
Site Remediation	1.802%		$ 2,490,000	-	$ 2,902,000		$44,881	-	$52,307
Subtotal							$139,388	-	$176,710
Total Initial Costs							**$352,388**	-	**$445,710**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$213,000	-	$269,000		$14,910	-	$18,830
Year 2 Equipment Maintenance	7%		$213,000	-	$269,000		$14,910	-	$18,830
Year 3 Equipment Maintenance	7%		$213,000	-	$269,000		$14,910	-	$18,830
Year 4 Equipment Maintenance	7%		$213,000	-	$269,000		$14,910	-	$18,830
Year 5 Equipment Maintenance	7%		$213,000	-	$269,000		$14,910	-	$18,830
Year 6 Equipment Maintenance	7%		$213,000	-	$269,000		$14,910	-	$18,830
Year 7 Equipment Maintenance	7%		$213,000	-	$269,000		$14,910	-	$18,830
Year 8 Equipment Maintenance	7%		$213,000	-	$269,000		$14,910	-	$18,830
Year 9 Equipment Maintenance	7%		$213,000	-	$269,000		$14,910	-	$18,830
Year 10 Equipment Maintenance	7%		$213,000	-	$269,000		$14,910	-	$18,830
Life Cycle Equipment Replacement	100%		$213,000	-	$269,000		$213,000	-	$269,000
Total Maintenance/Replacement							**$362,100**	**-**	**$457,300**
TOTAL 10-YEAR COST							**$714,488**	**-**	**$903,010**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY COUNTY PARKS RANGERS

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	19		$ 4,500	-	$ 5,500		$85,500	-	$104,500
Portable Radios - High End	22		$ 3,500	-	$ 5,000		$77,000	-	$110,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$162,500	-	$214,500
Shared Costs									
Engineering Study	1.478%		$ 368,250	-	$ 466,850		$5,443	-	$6,900
Trunked System Fixed Equipment	1.478%		$ 3,750,000	-	$ 4,950,000		$55,425	-	$73,161
Trunked System Implementation Services	1.478%		$ 1,125,000	-	$ 1,485,000		$16,628	-	$21,948
Site Remediation	1.478%		$ 2,490,000	-	$ 2,902,000		$36,802	-	$42,892
Subtotal							$114,298	-	$144,902
Total Initial Costs							**$276,798**	-	**$359,402**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$162,500	-	$214,500		$11,375	-	$15,015
Year 2 Equipment Maintenance	7%		$162,500	-	$214,500		$11,375	-	$15,015
Year 3 Equipment Maintenance	7%		$162,500	-	$214,500		$11,375	-	$15,015
Year 4 Equipment Maintenance	7%		$162,500	-	$214,500		$11,375	-	$15,015
Year 5 Equipment Maintenance	7%		$162,500	-	$214,500		$11,375	-	$15,015
Year 6 Equipment Maintenance	7%		$162,500	-	$214,500		$11,375	-	$15,015
Year 7 Equipment Maintenance	7%		$162,500	-	$214,500		$11,375	-	$15,015
Year 8 Equipment Maintenance	7%		$162,500	-	$214,500		$11,375	-	$15,015
Year 9 Equipment Maintenance	7%		$162,500	-	$214,500		$11,375	-	$15,015
Year 10 Equipment Maintenance	7%		$162,500	-	$214,500		$11,375	-	$15,015
Life Cycle Equipment Replacement	100%		$162,500	-	$214,500		$162,500	-	$214,500
Total Maintenance/Replacement							**$276,250**	**-**	**$364,650**
TOTAL 10-YEAR COST							**$553,048**	**-**	**$724,052**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY COUNTY PROBATION

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	16		$ 4,500	-	$ 5,500		$72,000	-	$88,000
Portable Radios - High End	98		$ 3,500	-	$ 5,000		$343,000	-	$490,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$415,000	-	$578,000
Shared Costs									
Engineering Study	4.110%		$ 368,250	-	$ 466,850		$15,134	-	$19,186
Trunked System Fixed Equipment	4.110%		$ 3,750,000	-	$ 4,950,000		$154,110	-	$203,425
Trunked System Implementation Services	4.110%		$ 1,125,000	-	$ 1,485,000		$46,233	-	$61,027
Site Remediation	4.110%		$ 2,490,000	-	$ 2,902,000		$102,329	-	$119,260
Subtotal							$317,805	-	$402,898
Total Initial Costs							**$732,805**	-	**$980,898**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$415,000	-	$578,000		$29,050	-	$40,460
Year 2 Equipment Maintenance	7%		$415,000	-	$578,000		$29,050	-	$40,460
Year 3 Equipment Maintenance	7%		$415,000	-	$578,000		$29,050	-	$40,460
Year 4 Equipment Maintenance	7%		$415,000	-	$578,000		$29,050	-	$40,460
Year 5 Equipment Maintenance	7%		$415,000	-	$578,000		$29,050	-	$40,460
Year 6 Equipment Maintenance	7%		$415,000	-	$578,000		$29,050	-	$40,460
Year 7 Equipment Maintenance	7%		$415,000	-	$578,000		$29,050	-	$40,460
Year 8 Equipment Maintenance	7%		$415,000	-	$578,000		$29,050	-	$40,460
Year 9 Equipment Maintenance	7%		$415,000	-	$578,000		$29,050	-	$40,460
Year 10 Equipment Maintenance	7%		$415,000	-	$578,000		$29,050	-	$40,460
Life Cycle Equipment Replacement	100%		$415,000	-	$578,000		$415,000	-	$578,000
Total Maintenance/Replacement							**$705,500**	**-**	**$982,600**
TOTAL 10-YEAR COST							**$1,438,305**	**-**	**$1,963,498**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY COUNTY SHERIFF

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	192		$ 4,500	-	$ 5,500		$864,000	-	$1,056,000
Portable Radios - High End	551		$ 3,500	-	$ 5,000		$1,928,500	-	$2,755,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$2,792,500	-	$3,811,000
Shared Costs									
Engineering Study	26.784%		$ 368,250	-	$ 466,850		$98,634	-	$125,043
Trunked System Fixed Equipment	26.784%		$ 3,750,000	-	$ 4,950,000		$1,004,416	-	$1,325,829
Trunked System Implementation Services	26.784%		$ 1,125,000	-	$ 1,485,000		$301,325	-	$397,749
Site Remediation	26.784%		$ 2,490,000	-	$ 2,902,000		$666,932	-	$777,284
Subtotal							$2,071,307	-	$2,625,905
Total Initial Costs							**$4,863,807**	-	**$6,436,905**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$2,792,500	-	$3,811,000		$195,475	-	$266,770
Year 2 Equipment Maintenance	7%		$2,792,500	-	$3,811,000		$195,475	-	$266,770
Year 3 Equipment Maintenance	7%		$2,792,500	-	$3,811,000		$195,475	-	$266,770
Year 4 Equipment Maintenance	7%		$2,792,500	-	$3,811,000		$195,475	-	$266,770
Year 5 Equipment Maintenance	7%		$2,792,500	-	$3,811,000		$195,475	-	$266,770
Year 6 Equipment Maintenance	7%		$2,792,500	-	$3,811,000		$195,475	-	$266,770
Year 7 Equipment Maintenance	7%		$2,792,500	-	$3,811,000		$195,475	-	$266,770
Year 8 Equipment Maintenance	7%		$2,792,500	-	$3,811,000		$195,475	-	$266,770
Year 9 Equipment Maintenance	7%		$2,792,500	-	$3,811,000		$195,475	-	$266,770
Year 10 Equipment Maintenance	7%		$2,792,500	-	$3,811,000		$195,475	-	$266,770
Life Cycle Equipment Replacement	100%		$2,792,500	-	$3,811,000		$2,792,500	-	$3,811,000
Total Maintenance/Replacement							**$4,747,250**	**-**	**$6,478,700**
TOTAL 10-YEAR COST							**$9,611,057**	**-**	**$12,915,605**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

PACIFIC GROVE POLICE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	8		$ 4,500	-	$ 5,500		$36,000	-	$44,000
Portable Radios - High End	36		$ 3,500	-	$ 5,000		$126,000	-	$180,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$162,000	-	$224,000
Shared Costs									
Engineering Study	1.586%		$ 368,250	-	$ 466,850		$5,841	-	$7,405
Trunked System Fixed Equipment	1.586%		$ 3,750,000	-	$ 4,950,000		$59,481	-	$78,515
Trunked System Implementation Services	1.586%		$ 1,125,000	-	$ 1,485,000		$17,844	-	$23,554
Site Remediation	1.586%		$ 2,490,000	-	$ 2,902,000		$39,495	-	$46,030
Subtotal							$122,661	-	$155,504
Total Initial Costs							**$284,661**	-	**$379,504**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$162,000	-	$224,000		$11,340	-	$15,680
Year 2 Equipment Maintenance	7%		$162,000	-	$224,000		$11,340	-	$15,680
Year 3 Equipment Maintenance	7%		$162,000	-	$224,000		$11,340	-	$15,680
Year 4 Equipment Maintenance	7%		$162,000	-	$224,000		$11,340	-	$15,680
Year 5 Equipment Maintenance	7%		$162,000	-	$224,000		$11,340	-	$15,680
Year 6 Equipment Maintenance	7%		$162,000	-	$224,000		$11,340	-	$15,680
Year 7 Equipment Maintenance	7%		$162,000	-	$224,000		$11,340	-	$15,680
Year 8 Equipment Maintenance	7%		$162,000	-	$224,000		$11,340	-	$15,680
Year 9 Equipment Maintenance	7%		$162,000	-	$224,000		$11,340	-	$15,680
Year 10 Equipment Maintenance	7%		$162,000	-	$224,000		$11,340	-	$15,680
Life Cycle Equipment Replacement	100%		$162,000	-	$224,000		$162,000	-	$224,000
Total Maintenance/Replacement							**$275,400**	**-**	**$380,800**
TOTAL 10-YEAR COST							**$560,061**	**-**	**$760,304**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

SALINAS POLICE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	79		$ 4,500	-	$ 5,500		$355,500	-	$434,500
Portable Radios - High End	214		$ 3,500	-	$ 5,000		$749,000	-	$1,070,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$1,104,500	-	$1,504,500
Shared Costs									
Engineering Study	10.562%		$ 368,250	-	$ 466,850		$38,896	-	$49,310
Trunked System Fixed Equipment	10.562%		$ 3,750,000	-	$ 4,950,000		$396,089	-	$522,837
Trunked System Implementation Services	10.562%		$ 1,125,000	-	$ 1,485,000		$118,827	-	$156,851
Site Remediation	10.562%		$ 2,490,000	-	$ 2,902,000		$263,003	-	$306,520
Subtotal							$816,814	-	$1,035,518
Total Initial Costs							**$1,921,314**	-	**$2,540,018**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$1,104,500	-	$1,504,500		$77,315	-	$105,315
Year 2 Equipment Maintenance	7%		$1,104,500	-	$1,504,500		$77,315	-	$105,315
Year 3 Equipment Maintenance	7%		$1,104,500	-	$1,504,500		$77,315	-	$105,315
Year 4 Equipment Maintenance	7%		$1,104,500	-	$1,504,500		$77,315	-	$105,315
Year 5 Equipment Maintenance	7%		$1,104,500	-	$1,504,500		$77,315	-	$105,315
Year 6 Equipment Maintenance	7%		$1,104,500	-	$1,504,500		$77,315	-	$105,315
Year 7 Equipment Maintenance	7%		$1,104,500	-	$1,504,500		$77,315	-	$105,315
Year 8 Equipment Maintenance	7%		$1,104,500	-	$1,504,500		$77,315	-	$105,315
Year 9 Equipment Maintenance	7%		$1,104,500	-	$1,504,500		$77,315	-	$105,315
Year 10 Equipment Maintenance	7%		$1,104,500	-	$1,504,500		$77,315	-	$105,315
Life Cycle Equipment Replacement	100%		$1,104,500	-	$1,504,500		$1,104,500	-	$1,504,500
Total Maintenance/Replacement							**$1,877,650**	**-**	**$2,557,650**
TOTAL 10-YEAR COST							**$3,798,964**	**-**	**$5,097,668**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

SAND CITY POLICE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	6		$ 4,500	-	$ 5,500		$27,000	-	$33,000
Portable Radios - High End	16		$ 3,500	-	$ 5,000		$56,000	-	$80,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$83,000	-	$113,000
Shared Costs									
Engineering Study	0.793%		$ 368,250	-	$ 466,850		$2,921	-	$3,702
Trunked System Fixed Equipment	0.793%		$ 3,750,000	-	$ 4,950,000		$29,740	-	$39,257
Trunked System Implementation Services	0.793%		$ 1,125,000	-	$ 1,485,000		$8,922	-	$11,777
Site Remediation	0.793%		$ 2,490,000	-	$ 2,902,000		$19,748	-	$23,015
Subtotal							$61,331	-	$77,752
Total Initial Costs							**$144,331**	-	**$190,752**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$83,000	-	$113,000		$5,810	-	$7,910
Year 2 Equipment Maintenance	7%		$83,000	-	$113,000		$5,810	-	$7,910
Year 3 Equipment Maintenance	7%		$83,000	-	$113,000		$5,810	-	$7,910
Year 4 Equipment Maintenance	7%		$83,000	-	$113,000		$5,810	-	$7,910
Year 5 Equipment Maintenance	7%		$83,000	-	$113,000		$5,810	-	$7,910
Year 6 Equipment Maintenance	7%		$83,000	-	$113,000		$5,810	-	$7,910
Year 7 Equipment Maintenance	7%		$83,000	-	$113,000		$5,810	-	$7,910
Year 8 Equipment Maintenance	7%		$83,000	-	$113,000		$5,810	-	$7,910
Year 9 Equipment Maintenance	7%		$83,000	-	$113,000		$5,810	-	$7,910
Year 10 Equipment Maintenance	7%		$83,000	-	$113,000		$5,810	-	$7,910
Life Cycle Equipment Replacement	100%		$83,000	-	$113,000		$83,000	-	$113,000
Total Maintenance/Replacement							**$141,100**	**-**	**$192,100**
TOTAL 10-YEAR COST							**$285,431**	**-**	**$382,852**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

SEASIDE POLICE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	28		$ 4,500	-	$ 5,500		$126,000	-	$154,000
Portable Radios - High End	39		$ 3,500	-	$ 5,000		$136,500	-	$195,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$262,500	-	$349,000
Shared Costs									
Engineering Study	2.415%		$ 368,250	-	$ 466,850		$8,894	-	$11,276
Trunked System Fixed Equipment	2.415%		$ 3,750,000	-	$ 4,950,000		$90,573	-	$119,557
Trunked System Implementation Services	2.415%		$ 1,125,000	-	$ 1,485,000		$27,172	-	$35,867
Site Remediation	2.415%		$ 2,490,000	-	$ 2,902,000		$60,141	-	$70,092
Subtotal							$186,780	-	$236,791
Total Initial Costs							**$449,280**	-	**$585,791**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$262,500	-	$349,000		$18,375	-	$24,430
Year 2 Equipment Maintenance	7%		$262,500	-	$349,000		$18,375	-	$24,430
Year 3 Equipment Maintenance	7%		$262,500	-	$349,000		$18,375	-	$24,430
Year 4 Equipment Maintenance	7%		$262,500	-	$349,000		$18,375	-	$24,430
Year 5 Equipment Maintenance	7%		$262,500	-	$349,000		$18,375	-	$24,430
Year 6 Equipment Maintenance	7%		$262,500	-	$349,000		$18,375	-	$24,430
Year 7 Equipment Maintenance	7%		$262,500	-	$349,000		$18,375	-	$24,430
Year 8 Equipment Maintenance	7%		$262,500	-	$349,000		$18,375	-	$24,430
Year 9 Equipment Maintenance	7%		$262,500	-	$349,000		$18,375	-	$24,430
Year 10 Equipment Maintenance	7%		$262,500	-	$349,000		$18,375	-	$24,430
Life Cycle Equipment Replacement	100%		$262,500	-	$349,000		$262,500	-	$349,000
Total Maintenance/Replacement							**$446,250**	**-**	**$593,300**
TOTAL 10-YEAR COST							**$895,530**	**-**	**$1,179,091**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

SOLEDAD CORRECTIONAL TRAINING FACILITY

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	7		$ 4,500	-	$ 5,500		$31,500	-	$38,500
Portable Radios - High End	5		$ 3,500	-	$ 5,000		$17,500	-	$25,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$49,000	-	$63,500
Shared Costs									
Engineering Study	0.433%		$ 368,250	-	$ 466,850		$1,593	-	$2,020
Trunked System Fixed Equipment	0.433%		$ 3,750,000	-	$ 4,950,000		$16,222	-	$21,413
Trunked System Implementation Services	0.433%		$ 1,125,000	-	$ 1,485,000		$4,867	-	$6,424
Site Remediation	0.433%		$ 2,490,000	-	$ 2,902,000		$10,771	-	$12,554
Subtotal							$33,453	-	$42,410
Total Initial Costs							**$82,453**	-	**$105,910**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$49,000	-	$63,500		$3,430	-	$4,445
Year 2 Equipment Maintenance	7%		$49,000	-	$63,500		$3,430	-	$4,445
Year 3 Equipment Maintenance	7%		$49,000	-	$63,500		$3,430	-	$4,445
Year 4 Equipment Maintenance	7%		$49,000	-	$63,500		$3,430	-	$4,445
Year 5 Equipment Maintenance	7%		$49,000	-	$63,500		$3,430	-	$4,445
Year 6 Equipment Maintenance	7%		$49,000	-	$63,500		$3,430	-	$4,445
Year 7 Equipment Maintenance	7%		$49,000	-	$63,500		$3,430	-	$4,445
Year 8 Equipment Maintenance	7%		$49,000	-	$63,500		$3,430	-	$4,445
Year 9 Equipment Maintenance	7%		$49,000	-	$63,500		$3,430	-	$4,445
Year 10 Equipment Maintenance	7%		$49,000	-	$63,500		$3,430	-	$4,445
Life Cycle Equipment Replacement	100%		$49,000	-	$63,500		$49,000	-	$63,500
Total Maintenance/Replacement							**$83,300**	**-**	**$107,950**
TOTAL 10-YEAR COST							**$165,753**	**-**	**$213,860**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

SOLEDAD POLICE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	7		$ 4,500	-	$ 5,500		$31,500	-	$38,500
Portable Radios - High End	16		$ 3,500	-	$ 5,000		$56,000	-	$80,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$87,500	-	$118,500
Shared Costs									
Engineering Study	0.829%		$ 368,250	-	$ 466,850		$3,053	-	$3,871
Trunked System Fixed Equipment	0.829%		$ 3,750,000	-	$ 4,950,000		$31,092	-	$41,042
Trunked System Implementation Services	0.829%		$ 1,125,000	-	$ 1,485,000		$9,328	-	$12,313
Site Remediation	0.829%		$ 2,490,000	-	$ 2,902,000		$20,645	-	$24,061
Subtotal							$64,119	-	$81,286
Total Initial Costs							**$151,619**	-	**$199,786**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$87,500	-	$118,500		$6,125	-	$8,295
Year 2 Equipment Maintenance	7%		$87,500	-	$118,500		$6,125	-	$8,295
Year 3 Equipment Maintenance	7%		$87,500	-	$118,500		$6,125	-	$8,295
Year 4 Equipment Maintenance	7%		$87,500	-	$118,500		$6,125	-	$8,295
Year 5 Equipment Maintenance	7%		$87,500	-	$118,500		$6,125	-	$8,295
Year 6 Equipment Maintenance	7%		$87,500	-	$118,500		$6,125	-	$8,295
Year 7 Equipment Maintenance	7%		$87,500	-	$118,500		$6,125	-	$8,295
Year 8 Equipment Maintenance	7%		$87,500	-	$118,500		$6,125	-	$8,295
Year 9 Equipment Maintenance	7%		$87,500	-	$118,500		$6,125	-	$8,295
Year 10 Equipment Maintenance	7%		$87,500	-	$118,500		$6,125	-	$8,295
Life Cycle Equipment Replacement	100%		$87,500	-	$118,500		$87,500	-	$118,500
Total Maintenance/Replacement							**$148,750**	**-**	**$201,450**
TOTAL 10-YEAR COST							**$300,369**	**-**	**$401,236**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

BIG SUR VOLUNTEER FIRE BRIGADE

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	12		$ 4,500	-	$ 5,500		$54,000	-	$66,000
Portable Radios - High End	34		$ 3,500	-	$ 5,000		$119,000	-	$170,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$173,000	-	$236,000
Shared Costs									
Engineering Study	1.658%		$ 368,250	-	$ 466,850		$6,107	-	$7,742
Trunked System Fixed Equipment	1.658%		$ 3,750,000	-	$ 4,950,000		$62,185	-	$82,084
Trunked System Implementation Services	1.658%		$ 1,125,000	-	$ 1,485,000		$18,655	-	$24,625
Site Remediation	1.658%		$ 2,490,000	-	$ 2,902,000		$41,291	-	$48,123
Subtotal							$128,237	-	$162,573
Total Initial Costs							**$301,237**	-	**$398,573**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$173,000	-	$236,000		$12,110	-	$16,520
Year 2 Equipment Maintenance	7%		$173,000	-	$236,000		$12,110	-	$16,520
Year 3 Equipment Maintenance	7%		$173,000	-	$236,000		$12,110	-	$16,520
Year 4 Equipment Maintenance	7%		$173,000	-	$236,000		$12,110	-	$16,520
Year 5 Equipment Maintenance	7%		$173,000	-	$236,000		$12,110	-	$16,520
Year 6 Equipment Maintenance	7%		$173,000	-	$236,000		$12,110	-	$16,520
Year 7 Equipment Maintenance	7%		$173,000	-	$236,000		$12,110	-	$16,520
Year 8 Equipment Maintenance	7%		$173,000	-	$236,000		$12,110	-	$16,520
Year 9 Equipment Maintenance	7%		$173,000	-	$236,000		$12,110	-	$16,520
Year 10 Equipment Maintenance	7%		$173,000	-	$236,000		$12,110	-	$16,520
Life Cycle Equipment Replacement	100%		$173,000	-	$236,000		$173,000	-	$236,000
Total Maintenance/Replacement							**$294,100**	**-**	**$401,200**
TOTAL 10-YEAR COST							**$595,337**	**-**	**$799,773**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

CARMEL CITY FIRE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	13		$ 4,500	-	$ 5,500		$58,500	-	$71,500
Portable Radios - High End	36		$ 3,500	-	$ 5,000		$126,000	-	$180,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$184,500	-	$251,500
Shared Costs									
Engineering Study	1.766%		$ 368,250	-	$ 466,850		$6,505	-	$8,246
Trunked System Fixed Equipment	1.766%		$ 3,750,000	-	$ 4,950,000		$66,240	-	$87,437
Trunked System Implementation Services	1.766%		$ 1,125,000	-	$ 1,485,000		$19,872	-	$26,231
Site Remediation	1.766%		$ 2,490,000	-	$ 2,902,000		$43,983	-	$51,261
Subtotal							$136,600	-	$173,175
Total Initial Costs							**$321,100**	-	**$424,675**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$184,500	-	$251,500		$12,915	-	$17,605
Year 2 Equipment Maintenance	7%		$184,500	-	$251,500		$12,915	-	$17,605
Year 3 Equipment Maintenance	7%		$184,500	-	$251,500		$12,915	-	$17,605
Year 4 Equipment Maintenance	7%		$184,500	-	$251,500		$12,915	-	$17,605
Year 5 Equipment Maintenance	7%		$184,500	-	$251,500		$12,915	-	$17,605
Year 6 Equipment Maintenance	7%		$184,500	-	$251,500		$12,915	-	$17,605
Year 7 Equipment Maintenance	7%		$184,500	-	$251,500		$12,915	-	$17,605
Year 8 Equipment Maintenance	7%		$184,500	-	$251,500		$12,915	-	$17,605
Year 9 Equipment Maintenance	7%		$184,500	-	$251,500		$12,915	-	$17,605
Year 10 Equipment Maintenance	7%		$184,500	-	$251,500		$12,915	-	$17,605
Life Cycle Equipment Replacement	100%		$184,500	-	$251,500		$184,500	-	$251,500
Total Maintenance/Replacement							**$313,650**	**-**	**$427,550**
TOTAL 10-YEAR COST							**$634,750**	**-**	**$852,225**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

CARMEL VALLEY FIRE

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	32		$ 4,500	-	$ 5,500		$144,000	-	$176,000
Portable Radios - High End	52		$ 3,500	-	$ 5,000		$182,000	-	$260,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$326,000	-	$436,000
Shared Costs									
Engineering Study	3.028%		$ 368,250	-	$ 466,850		$11,151	-	$14,137
Trunked System Fixed Equipment	3.028%		$ 3,750,000	-	$ 4,950,000		$113,554	-	$149,892
Trunked System Implementation Services	3.028%		$ 1,125,000	-	$ 1,485,000		$34,066	-	$44,968
Site Remediation	3.028%		$ 2,490,000	-	$ 2,902,000		$75,400	-	$87,876
Subtotal							$234,172	-	$296,872
Total Initial Costs							**$560,172**	-	**$732,872**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$326,000	-	$436,000		$22,820	-	$30,520
Year 2 Equipment Maintenance	7%		$326,000	-	$436,000		$22,820	-	$30,520
Year 3 Equipment Maintenance	7%		$326,000	-	$436,000		$22,820	-	$30,520
Year 4 Equipment Maintenance	7%		$326,000	-	$436,000		$22,820	-	$30,520
Year 5 Equipment Maintenance	7%		$326,000	-	$436,000		$22,820	-	$30,520
Year 6 Equipment Maintenance	7%		$326,000	-	$436,000		$22,820	-	$30,520
Year 7 Equipment Maintenance	7%		$326,000	-	$436,000		$22,820	-	$30,520
Year 8 Equipment Maintenance	7%		$326,000	-	$436,000		$22,820	-	$30,520
Year 9 Equipment Maintenance	7%		$326,000	-	$436,000		$22,820	-	$30,520
Year 10 Equipment Maintenance	7%		$326,000	-	$436,000		$22,820	-	$30,520
Life Cycle Equipment Replacement	100%		$326,000	-	$436,000		$326,000	-	$436,000
Total Maintenance/Replacement							**$554,200**	**-**	**$741,200**
TOTAL 10-YEAR COST							**$1,114,372**	**-**	**$1,474,072**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

GONZALEZ FIRE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	9		$ 4,500	-	$ 5,500		$40,500	-	$49,500
Portable Radios - High End	21		$ 3,500	-	$ 5,000		$73,500	-	$105,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$114,000	-	$154,500
Shared Costs									
Engineering Study	1.081%		$ 368,250	-	$ 466,850		$3,983	-	$5,049
Trunked System Fixed Equipment	1.081%		$ 3,750,000	-	$ 4,950,000		$40,555	-	$53,533
Trunked System Implementation Services	1.081%		$ 1,125,000	-	$ 1,485,000		$12,167	-	$16,060
Site Remediation	1.081%		$ 2,490,000	-	$ 2,902,000		$26,929	-	$31,384
Subtotal							$83,633	-	$106,026
Total Initial Costs							**$197,633**	-	**$260,526**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$114,000	-	$154,500		$7,980	-	$10,815
Year 2 Equipment Maintenance	7%		$114,000	-	$154,500		$7,980	-	$10,815
Year 3 Equipment Maintenance	7%		$114,000	-	$154,500		$7,980	-	$10,815
Year 4 Equipment Maintenance	7%		$114,000	-	$154,500		$7,980	-	$10,815
Year 5 Equipment Maintenance	7%		$114,000	-	$154,500		$7,980	-	$10,815
Year 6 Equipment Maintenance	7%		$114,000	-	$154,500		$7,980	-	$10,815
Year 7 Equipment Maintenance	7%		$114,000	-	$154,500		$7,980	-	$10,815
Year 8 Equipment Maintenance	7%		$114,000	-	$154,500		$7,980	-	$10,815
Year 9 Equipment Maintenance	7%		$114,000	-	$154,500		$7,980	-	$10,815
Year 10 Equipment Maintenance	7%		$114,000	-	$154,500		$7,980	-	$10,815
Life Cycle Equipment Replacement	100%		$114,000	-	$154,500		$114,000	-	$154,500
Total Maintenance/Replacement							**$193,800**	**-**	**$262,650**
TOTAL 10-YEAR COST							**$391,433**	**-**	**$523,176**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

GREENFIELD FIRE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	7		$ 4,500	-	$ 5,500		$31,500	-	$38,500
Portable Radios - High End	18		$ 3,500	-	$ 5,000		$63,000	-	$90,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$94,500	-	$128,500
Shared Costs									
Engineering Study	0.901%		$ 368,250	-	$ 466,850		$3,319	-	$4,207
Trunked System Fixed Equipment	0.901%		$ 3,750,000	-	$ 4,950,000		$33,796	-	$44,611
Trunked System Implementation Services	0.901%		$ 1,125,000	-	$ 1,485,000		$10,139	-	$13,383
Site Remediation	0.901%		$ 2,490,000	-	$ 2,902,000		$22,441	-	$26,154
Subtotal							$69,694	-	$88,355
Total Initial Costs							**$164,194**	-	**$216,855**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$94,500	-	$128,500		$6,615	-	$8,995
Year 2 Equipment Maintenance	7%		$94,500	-	$128,500		$6,615	-	$8,995
Year 3 Equipment Maintenance	7%		$94,500	-	$128,500		$6,615	-	$8,995
Year 4 Equipment Maintenance	7%		$94,500	-	$128,500		$6,615	-	$8,995
Year 5 Equipment Maintenance	7%		$94,500	-	$128,500		$6,615	-	$8,995
Year 6 Equipment Maintenance	7%		$94,500	-	$128,500		$6,615	-	$8,995
Year 7 Equipment Maintenance	7%		$94,500	-	$128,500		$6,615	-	$8,995
Year 8 Equipment Maintenance	7%		$94,500	-	$128,500		$6,615	-	$8,995
Year 9 Equipment Maintenance	7%		$94,500	-	$128,500		$6,615	-	$8,995
Year 10 Equipment Maintenance	7%		$94,500	-	$128,500		$6,615	-	$8,995
Life Cycle Equipment Replacement	100%		$94,500	-	$128,500		$94,500	-	$128,500
Total Maintenance/Replacement							**$160,650**	**-**	**$218,450**
TOTAL 10-YEAR COST							**$324,844**	**-**	**$435,305**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

KING CITY FIRE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	9		$ 4,500	-	$ 5,500		$40,500	-	$49,500
Portable Radios - High End	15		$ 3,500	-	$ 5,000		$52,500	-	$75,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$93,000	-	$124,500
Shared Costs									
Engineering Study	0.865%		$ 368,250	-	$ 466,850		$3,186	-	$4,039
Trunked System Fixed Equipment	0.865%		$ 3,750,000	-	$ 4,950,000		$32,444	-	$42,826
Trunked System Implementation Services	0.865%		$ 1,125,000	-	$ 1,485,000		$9,733	-	$12,848
Site Remediation	0.865%		$ 2,490,000	-	$ 2,902,000		$21,543	-	$25,107
Subtotal							$66,906	-	$84,821
Total Initial Costs							**$159,906**	-	**$209,321**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$93,000	-	$124,500		$6,510	-	$8,715
Year 2 Equipment Maintenance	7%		$93,000	-	$124,500		$6,510	-	$8,715
Year 3 Equipment Maintenance	7%		$93,000	-	$124,500		$6,510	-	$8,715
Year 4 Equipment Maintenance	7%		$93,000	-	$124,500		$6,510	-	$8,715
Year 5 Equipment Maintenance	7%		$93,000	-	$124,500		$6,510	-	$8,715
Year 6 Equipment Maintenance	7%		$93,000	-	$124,500		$6,510	-	$8,715
Year 7 Equipment Maintenance	7%		$93,000	-	$124,500		$6,510	-	$8,715
Year 8 Equipment Maintenance	7%		$93,000	-	$124,500		$6,510	-	$8,715
Year 9 Equipment Maintenance	7%		$93,000	-	$124,500		$6,510	-	$8,715
Year 10 Equipment Maintenance	7%		$93,000	-	$124,500		$6,510	-	$8,715
Life Cycle Equipment Replacement	100%		$93,000	-	$124,500		$93,000	-	$124,500
Total Maintenance/Replacement							**$158,100**	**-**	**$211,650**
TOTAL 10-YEAR COST							**$318,006**	**-**	**$420,971**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

Marina Public Safety - Fire Division

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	13		$ 4,500	-	$ 5,500		$58,500	-	$71,500
Portable Radios - High End	20		$ 3,500	-	$ 5,000		$70,000	-	$100,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$128,500	-	$171,500
Shared Costs									
Engineering Study	1.190%		$ 368,250	-	$ 466,850		$4,381	-	$5,554
Trunked System Fixed Equipment	1.190%		$ 3,750,000	-	$ 4,950,000		$44,611	-	$58,886
Trunked System Implementation Services	1.190%		$ 1,125,000	-	$ 1,485,000		$13,383	-	$17,666
Site Remediation	1.190%		$ 2,490,000	-	$ 2,902,000		$29,621	-	$34,523
Subtotal							$91,996	-	$116,628
Total Initial Costs							**$220,496**	-	**$288,128**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$128,500	-	$171,500		$8,995	-	$12,005
Year 2 Equipment Maintenance	7%		$128,500	-	$171,500		$8,995	-	$12,005
Year 3 Equipment Maintenance	7%		$128,500	-	$171,500		$8,995	-	$12,005
Year 4 Equipment Maintenance	7%		$128,500	-	$171,500		$8,995	-	$12,005
Year 5 Equipment Maintenance	7%		$128,500	-	$171,500		$8,995	-	$12,005
Year 6 Equipment Maintenance	7%		$128,500	-	$171,500		$8,995	-	$12,005
Year 7 Equipment Maintenance	7%		$128,500	-	$171,500		$8,995	-	$12,005
Year 8 Equipment Maintenance	7%		$128,500	-	$171,500		$8,995	-	$12,005
Year 9 Equipment Maintenance	7%		$128,500	-	$171,500		$8,995	-	$12,005
Year 10 Equipment Maintenance	7%		$128,500	-	$171,500		$8,995	-	$12,005
Life Cycle Equipment Replacement	100%		$128,500	-	$171,500		$128,500	-	$171,500
Total Maintenance/Replacement							**$218,450**	**-**	**$291,550**
TOTAL 10-YEAR COST							**$438,946**	**-**	**$579,678**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY AIRPORT FIRE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	7		$ 4,500	-	$ 5,500		$31,500	-	$38,500
Portable Radios - High End	22		$ 3,500	-	$ 5,000		$77,000	-	$110,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$108,500	-	$148,500
Shared Costs									
Engineering Study	1.045%		$ 368,250	-	$ 466,850		$3,850	-	$4,881
Trunked System Fixed Equipment	1.045%		$ 3,750,000	-	$ 4,950,000		$39,203	-	$51,748
Trunked System Implementation Services	1.045%		$ 1,125,000	-	$ 1,485,000		$11,761	-	$15,525
Site Remediation	1.045%		$ 2,490,000	-	$ 2,902,000		$26,031	-	$30,338
Subtotal							$80,845	-	$102,492
Total Initial Costs							**$189,345**	-	**$250,992**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$108,500	-	$148,500		$7,595	-	$10,395
Year 2 Equipment Maintenance	7%		$108,500	-	$148,500		$7,595	-	$10,395
Year 3 Equipment Maintenance	7%		$108,500	-	$148,500		$7,595	-	$10,395
Year 4 Equipment Maintenance	7%		$108,500	-	$148,500		$7,595	-	$10,395
Year 5 Equipment Maintenance	7%		$108,500	-	$148,500		$7,595	-	$10,395
Year 6 Equipment Maintenance	7%		$108,500	-	$148,500		$7,595	-	$10,395
Year 7 Equipment Maintenance	7%		$108,500	-	$148,500		$7,595	-	$10,395
Year 8 Equipment Maintenance	7%		$108,500	-	$148,500		$7,595	-	$10,395
Year 9 Equipment Maintenance	7%		$108,500	-	$148,500		$7,595	-	$10,395
Year 10 Equipment Maintenance	7%		$108,500	-	$148,500		$7,595	-	$10,395
Life Cycle Equipment Replacement	100%		$108,500	-	$148,500		$108,500	-	$148,500
Total Maintenance/Replacement							**$184,450**	**-**	**$252,450**
TOTAL 10-YEAR COST							**$373,795**	**-**	**$503,442**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY CITY FIRE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	13		$ 4,500	-	$ 5,500		$58,500	-	$71,500
Portable Radios - High End	42		$ 3,500	-	$ 5,000		$147,000	-	$210,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$205,500	-	$281,500
Shared Costs									
Engineering Study	1.983%		$ 368,250	-	$ 466,850		$7,301	-	$9,256
Trunked System Fixed Equipment	1.983%		$ 3,750,000	-	$ 4,950,000		$74,351	-	$98,143
Trunked System Implementation Services	1.983%		$ 1,125,000	-	$ 1,485,000		$22,305	-	$29,443
Site Remediation	1.983%		$ 2,490,000	-	$ 2,902,000		$49,369	-	$57,538
Subtotal							$153,327	-	$194,381
Total Initial Costs							**$358,827**	-	**$475,881**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$205,500	-	$281,500		$14,385	-	$19,705
Year 2 Equipment Maintenance	7%		$205,500	-	$281,500		$14,385	-	$19,705
Year 3 Equipment Maintenance	7%		$205,500	-	$281,500		$14,385	-	$19,705
Year 4 Equipment Maintenance	7%		$205,500	-	$281,500		$14,385	-	$19,705
Year 5 Equipment Maintenance	7%		$205,500	-	$281,500		$14,385	-	$19,705
Year 6 Equipment Maintenance	7%		$205,500	-	$281,500		$14,385	-	$19,705
Year 7 Equipment Maintenance	7%		$205,500	-	$281,500		$14,385	-	$19,705
Year 8 Equipment Maintenance	7%		$205,500	-	$281,500		$14,385	-	$19,705
Year 9 Equipment Maintenance	7%		$205,500	-	$281,500		$14,385	-	$19,705
Year 10 Equipment Maintenance	7%		$205,500	-	$281,500		$14,385	-	$19,705
Life Cycle Equipment Replacement	100%		$205,500	-	$281,500		$205,500	-	$281,500
Total Maintenance/Replacement							**$349,350**	**-**	**$478,550**
TOTAL 10-YEAR COST							**$708,177**	**-**	**$954,431**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

NORTH COUNTY FIRE PROTECTION DISTRICT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	22		$ 4,500	-	$ 5,500		$99,000	-	$121,000
Portable Radios - High End	45		$ 3,500	-	$ 5,000		$157,500	-	$225,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$256,500	-	$346,000
Shared Costs									
Engineering Study	2.415%		$ 368,250	-	$ 466,850		$8,894	-	$11,276
Trunked System Fixed Equipment	2.415%		$ 3,750,000	-	$ 4,950,000		$90,573	-	$119,557
Trunked System Implementation Services	2.415%		$ 1,125,000	-	$ 1,485,000		$27,172	-	$35,867
Site Remediation	2.415%		$ 2,490,000	-	$ 2,902,000		$60,141	-	$70,092
Subtotal							$186,780	-	$236,791
Total Initial Costs							**$443,280**	-	**$582,791**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$256,500	-	$346,000		$17,955	-	$24,220
Year 2 Equipment Maintenance	7%		$256,500	-	$346,000		$17,955	-	$24,220
Year 3 Equipment Maintenance	7%		$256,500	-	$346,000		$17,955	-	$24,220
Year 4 Equipment Maintenance	7%		$256,500	-	$346,000		$17,955	-	$24,220
Year 5 Equipment Maintenance	7%		$256,500	-	$346,000		$17,955	-	$24,220
Year 6 Equipment Maintenance	7%		$256,500	-	$346,000		$17,955	-	$24,220
Year 7 Equipment Maintenance	7%		$256,500	-	$346,000		$17,955	-	$24,220
Year 8 Equipment Maintenance	7%		$256,500	-	$346,000		$17,955	-	$24,220
Year 9 Equipment Maintenance	7%		$256,500	-	$346,000		$17,955	-	$24,220
Year 10 Equipment Maintenance	7%		$256,500	-	$346,000		$17,955	-	$24,220
Life Cycle Equipment Replacement	100%		$256,500	-	$346,000		$256,500	-	$346,000
Total Maintenance/Replacement							**$436,050**	**-**	**$588,200**
TOTAL 10-YEAR COST							**$879,330**	**-**	**$1,170,991**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

PACIFIC GROVE FIRE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	13		$ 4,500	-	$ 5,500		$58,500	-	$71,500
Portable Radios - High End	27		$ 3,500	-	$ 5,000		$94,500	-	$135,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$153,000	-	$206,500
Shared Costs									
Engineering Study	1.442%		$ 368,250	-	$ 466,850		$5,310	-	$6,732
Trunked System Fixed Equipment	1.442%		$ 3,750,000	-	$ 4,950,000		$54,074	-	$71,377
Trunked System Implementation Services	1.442%		$ 1,125,000	-	$ 1,485,000		$16,222	-	$21,413
Site Remediation	1.442%		$ 2,490,000	-	$ 2,902,000		$35,905	-	$41,846
Subtotal							$111,510	-	$141,368
Total Initial Costs							**$264,510**	-	**$347,868**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$153,000	-	$206,500		$10,710	-	$14,455
Year 2 Equipment Maintenance	7%		$153,000	-	$206,500		$10,710	-	$14,455
Year 3 Equipment Maintenance	7%		$153,000	-	$206,500		$10,710	-	$14,455
Year 4 Equipment Maintenance	7%		$153,000	-	$206,500		$10,710	-	$14,455
Year 5 Equipment Maintenance	7%		$153,000	-	$206,500		$10,710	-	$14,455
Year 6 Equipment Maintenance	7%		$153,000	-	$206,500		$10,710	-	$14,455
Year 7 Equipment Maintenance	7%		$153,000	-	$206,500		$10,710	-	$14,455
Year 8 Equipment Maintenance	7%		$153,000	-	$206,500		$10,710	-	$14,455
Year 9 Equipment Maintenance	7%		$153,000	-	$206,500		$10,710	-	$14,455
Year 10 Equipment Maintenance	7%		$153,000	-	$206,500		$10,710	-	$14,455
Life Cycle Equipment Replacement	100%		$153,000	-	$206,500		$153,000	-	$206,500
Total Maintenance/Replacement							**$260,100**	**-**	**$351,050**
TOTAL 10-YEAR COST							**$524,610**	**-**	**$698,918**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

SALINAS FIRE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	33		$ 4,500	-	$ 5,500		$148,500	-	$181,500
Portable Radios - High End	81		$ 3,500	-	$ 5,000		$283,500	-	$405,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$432,000	-	$586,500
Shared Costs									
Engineering Study	4.110%		$ 368,250	-	$ 466,850		$15,134	-	$19,186
Trunked System Fixed Equipment	4.110%		$ 3,750,000	-	$ 4,950,000		$154,110	-	$203,425
Trunked System Implementation Services	4.110%		$ 1,125,000	-	$ 1,485,000		$46,233	-	$61,027
Site Remediation	4.110%		$ 2,490,000	-	$ 2,902,000		$102,329	-	$119,260
Subtotal							$317,805	-	$402,898
Total Initial Costs							**$749,805**	-	**$989,398**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$432,000	-	$586,500		$30,240	-	$41,055
Year 2 Equipment Maintenance	7%		$432,000	-	$586,500		$30,240	-	$41,055
Year 3 Equipment Maintenance	7%		$432,000	-	$586,500		$30,240	-	$41,055
Year 4 Equipment Maintenance	7%		$432,000	-	$586,500		$30,240	-	$41,055
Year 5 Equipment Maintenance	7%		$432,000	-	$586,500		$30,240	-	$41,055
Year 6 Equipment Maintenance	7%		$432,000	-	$586,500		$30,240	-	$41,055
Year 7 Equipment Maintenance	7%		$432,000	-	$586,500		$30,240	-	$41,055
Year 8 Equipment Maintenance	7%		$432,000	-	$586,500		$30,240	-	$41,055
Year 9 Equipment Maintenance	7%		$432,000	-	$586,500		$30,240	-	$41,055
Year 10 Equipment Maintenance	7%		$432,000	-	$586,500		$30,240	-	$41,055
Life Cycle Equipment Replacement	100%		$432,000	-	$586,500		$432,000	-	$586,500
Total Maintenance/Replacement							**$734,400**	**-**	**$997,050**
TOTAL 10-YEAR COST							**$1,484,205**	**-**	**$1,986,448**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

SALINAS RURAL FIRE PROTECTION DISTRICT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	21		$ 4,500	-	$ 5,500		$94,500	-	$115,500
Portable Radios - High End	36		$ 3,500	-	$ 5,000		$126,000	-	$180,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$220,500	-	$295,500
Shared Costs									
Engineering Study	2.055%		$ 368,250	-	$ 466,850		$7,567	-	$9,593
Trunked System Fixed Equipment	2.055%		$ 3,750,000	-	$ 4,950,000		$77,055	-	$101,712
Trunked System Implementation Services	2.055%		$ 1,125,000	-	$ 1,485,000		$23,116	-	$30,514
Site Remediation	2.055%		$ 2,490,000	-	$ 2,902,000		$51,164	-	$59,630
Subtotal							$158,902	-	$201,449
Total Initial Costs							**$379,402**	-	**$496,949**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$220,500	-	$295,500		$15,435	-	$20,685
Year 2 Equipment Maintenance	7%		$220,500	-	$295,500		$15,435	-	$20,685
Year 3 Equipment Maintenance	7%		$220,500	-	$295,500		$15,435	-	$20,685
Year 4 Equipment Maintenance	7%		$220,500	-	$295,500		$15,435	-	$20,685
Year 5 Equipment Maintenance	7%		$220,500	-	$295,500		$15,435	-	$20,685
Year 6 Equipment Maintenance	7%		$220,500	-	$295,500		$15,435	-	$20,685
Year 7 Equipment Maintenance	7%		$220,500	-	$295,500		$15,435	-	$20,685
Year 8 Equipment Maintenance	7%		$220,500	-	$295,500		$15,435	-	$20,685
Year 9 Equipment Maintenance	7%		$220,500	-	$295,500		$15,435	-	$20,685
Year 10 Equipment Maintenance	7%		$220,500	-	$295,500		$15,435	-	$20,685
Life Cycle Equipment Replacement	100%		$220,500	-	$295,500		$220,500	-	$295,500
Total Maintenance/Replacement							**$374,850**	**-**	**$502,350**
TOTAL 10-YEAR COST							**$754,252**	**-**	**$999,299**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

SEASIDE FIRE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	13		$ 4,500	-	$ 5,500		$58,500	-	$71,500
Portable Radios - High End	40		$ 3,500	-	$ 5,000		$140,000	-	$200,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$198,500	-	$271,500
Shared Costs									
Engineering Study	1.911%		$ 368,250	-	$ 466,850		$7,036	-	$8,920
Trunked System Fixed Equipment	1.911%		$ 3,750,000	-	$ 4,950,000		$71,647	-	$94,575
Trunked System Implementation Services	1.911%		$ 1,125,000	-	$ 1,485,000		$21,494	-	$28,372
Site Remediation	1.911%		$ 2,490,000	-	$ 2,902,000		$47,574	-	$55,446
Subtotal							$147,751	-	$187,312
Total Initial Costs							**$346,251**	-	**$458,812**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$198,500	-	$271,500		$13,895	-	$19,005
Year 2 Equipment Maintenance	7%		$198,500	-	$271,500		$13,895	-	$19,005
Year 3 Equipment Maintenance	7%		$198,500	-	$271,500		$13,895	-	$19,005
Year 4 Equipment Maintenance	7%		$198,500	-	$271,500		$13,895	-	$19,005
Year 5 Equipment Maintenance	7%		$198,500	-	$271,500		$13,895	-	$19,005
Year 6 Equipment Maintenance	7%		$198,500	-	$271,500		$13,895	-	$19,005
Year 7 Equipment Maintenance	7%		$198,500	-	$271,500		$13,895	-	$19,005
Year 8 Equipment Maintenance	7%		$198,500	-	$271,500		$13,895	-	$19,005
Year 9 Equipment Maintenance	7%		$198,500	-	$271,500		$13,895	-	$19,005
Year 10 Equipment Maintenance	7%		$198,500	-	$271,500		$13,895	-	$19,005
Life Cycle Equipment Replacement	100%		$198,500	-	$271,500		$198,500	-	$271,500
Total Maintenance/Replacement							**$337,450**	**-**	**$461,550**
TOTAL 10-YEAR COST							**$683,701**	**-**	**$920,362**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

SOLEDAD FIRE DEPARTMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	7		$ 4,500	-	$ 5,500		$31,500	-	$38,500
Portable Radios - High End	8		$ 3,500	-	$ 5,000		$28,000	-	$40,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$59,500	-	$78,500
Shared Costs									
Engineering Study	0.541%		$ 368,250	-	$ 466,850		$1,991	-	$2,524
Trunked System Fixed Equipment	0.541%		$ 3,750,000	-	$ 4,950,000		$20,278	-	$26,766
Trunked System Implementation Services	0.541%		$ 1,125,000	-	$ 1,485,000		$6,083	-	$8,030
Site Remediation	0.541%		$ 2,490,000	-	$ 2,902,000		$13,464	-	$15,692
Subtotal							$41,816	-	$53,013
Total Initial Costs							**$101,316**	-	**$131,513**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$59,500	-	$78,500		$4,165	-	$5,495
Year 2 Equipment Maintenance	7%		$59,500	-	$78,500		$4,165	-	$5,495
Year 3 Equipment Maintenance	7%		$59,500	-	$78,500		$4,165	-	$5,495
Year 4 Equipment Maintenance	7%		$59,500	-	$78,500		$4,165	-	$5,495
Year 5 Equipment Maintenance	7%		$59,500	-	$78,500		$4,165	-	$5,495
Year 6 Equipment Maintenance	7%		$59,500	-	$78,500		$4,165	-	$5,495
Year 7 Equipment Maintenance	7%		$59,500	-	$78,500		$4,165	-	$5,495
Year 8 Equipment Maintenance	7%		$59,500	-	$78,500		$4,165	-	$5,495
Year 9 Equipment Maintenance	7%		$59,500	-	$78,500		$4,165	-	$5,495
Year 10 Equipment Maintenance	7%		$59,500	-	$78,500		$4,165	-	$5,495
Life Cycle Equipment Replacement	100%		$59,500	-	$78,500		$59,500	-	$78,500
Total Maintenance/Replacement							**$101,150**	**-**	**$133,450**
TOTAL 10-YEAR COST							**$202,466**	**-**	**$264,963**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

SPRECKELS VOLUNTEER FIRE COMPANY

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	2		$ 4,500	-	$ 5,500		$9,000	-	$11,000
Portable Radios - High End	11		$ 3,500	-	$ 5,000		$38,500	-	$55,000
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$47,500	-	$66,000
Shared Costs									
Engineering Study	0.469%		$ 368,250	-	$ 466,850		$1,726	-	$2,188
Trunked System Fixed Equipment	0.469%		$ 3,750,000	-	$ 4,950,000		$17,574	-	$23,198
Trunked System Implementation Services	0.469%		$ 1,125,000	-	$ 1,485,000		$5,272	-	$6,959
Site Remediation	0.469%		$ 2,490,000	-	$ 2,902,000		$11,669	-	$13,600
Subtotal							$36,241	-	$45,945
Total Initial Costs							**$83,741**	-	**$111,945**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$47,500	-	$66,000		$3,325	-	$4,620
Year 2 Equipment Maintenance	7%		$47,500	-	$66,000		$3,325	-	$4,620
Year 3 Equipment Maintenance	7%		$47,500	-	$66,000		$3,325	-	$4,620
Year 4 Equipment Maintenance	7%		$47,500	-	$66,000		$3,325	-	$4,620
Year 5 Equipment Maintenance	7%		$47,500	-	$66,000		$3,325	-	$4,620
Year 6 Equipment Maintenance	7%		$47,500	-	$66,000		$3,325	-	$4,620
Year 7 Equipment Maintenance	7%		$47,500	-	$66,000		$3,325	-	$4,620
Year 8 Equipment Maintenance	7%		$47,500	-	$66,000		$3,325	-	$4,620
Year 9 Equipment Maintenance	7%		$47,500	-	$66,000		$3,325	-	$4,620
Year 10 Equipment Maintenance	7%		$47,500	-	$66,000		$3,325	-	$4,620
Life Cycle Equipment Replacement	100%		$47,500	-	$66,000		$47,500	-	$66,000
Total Maintenance/Replacement							**$80,750**	**-**	**$112,200**
TOTAL 10-YEAR COST							**$164,491**	**-**	**$224,145**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY COUNTY EMS

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	20		$ 4,500	-	$ 5,500		$90,000	-	$110,000
Portable Radios - High End	0		$ 3,500	-	$ 5,000		$0	-	$0
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$90,000	-	$110,000
Shared Costs									
Engineering Study	0.721%		$ 368,250	-	$ 466,850		$2,655	-	$3,366
Trunked System Fixed Equipment	0.721%		$ 3,750,000	-	$ 4,950,000		$27,037	-	$35,689
Trunked System Implementation Services	0.721%		$ 1,125,000	-	$ 1,485,000		$8,111	-	$10,707
Site Remediation	0.721%		$ 2,490,000	-	$ 2,902,000		$17,952	-	$20,923
Subtotal							$55,755	-	$70,684
Total Initial Costs							**$145,755**	-	**$180,684**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$90,000	-	$110,000		$6,300	-	$7,700
Year 2 Equipment Maintenance	7%		$90,000	-	$110,000		$6,300	-	$7,700
Year 3 Equipment Maintenance	7%		$90,000	-	$110,000		$6,300	-	$7,700
Year 4 Equipment Maintenance	7%		$90,000	-	$110,000		$6,300	-	$7,700
Year 5 Equipment Maintenance	7%		$90,000	-	$110,000		$6,300	-	$7,700
Year 6 Equipment Maintenance	7%		$90,000	-	$110,000		$6,300	-	$7,700
Year 7 Equipment Maintenance	7%		$90,000	-	$110,000		$6,300	-	$7,700
Year 8 Equipment Maintenance	7%		$90,000	-	$110,000		$6,300	-	$7,700
Year 9 Equipment Maintenance	7%		$90,000	-	$110,000		$6,300	-	$7,700
Year 10 Equipment Maintenance	7%		$90,000	-	$110,000		$6,300	-	$7,700
Life Cycle Equipment Replacement	100%		$90,000	-	$110,000		$90,000	-	$110,000
Total Maintenance/Replacement							**$153,000**	**-**	**$187,000**
TOTAL 10-YEAR COST							**$298,755**	**-**	**$367,684**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY CITY CONFERENCE CENTER

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	0		$ 4,500	-	$ 5,500		$0	-	$0
Portable Radios - High End	0		$ 3,500	-	$ 5,000		$0	-	$0
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	13		$ 2,000	-	$ 2,500		$26,000	-	$32,500
Subtotal							$26,000	-	$32,500
Shared Costs									
Engineering Study	0.469%		$ 368,250	-	$ 466,850		$1,726	-	$2,188
Trunked System Fixed Equipment	0.469%		$ 3,750,000	-	$ 4,950,000		$17,574	-	$23,198
Trunked System Implementation Services	0.469%		$ 1,125,000	-	$ 1,485,000		$5,272	-	$6,959
Site Remediation	0.469%		$ 2,490,000	-	$ 2,902,000		$11,669	-	$13,600
Subtotal							$36,241	-	$45,945
Total Initial Costs							**$62,241**	-	**$78,445**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$26,000	-	$32,500		$1,820	-	$2,275
Year 2 Equipment Maintenance	7%		$26,000	-	$32,500		$1,820	-	$2,275
Year 3 Equipment Maintenance	7%		$26,000	-	$32,500		$1,820	-	$2,275
Year 4 Equipment Maintenance	7%		$26,000	-	$32,500		$1,820	-	$2,275
Year 5 Equipment Maintenance	7%		$26,000	-	$32,500		$1,820	-	$2,275
Year 6 Equipment Maintenance	7%		$26,000	-	$32,500		$1,820	-	$2,275
Year 7 Equipment Maintenance	7%		$26,000	-	$32,500		$1,820	-	$2,275
Year 8 Equipment Maintenance	7%		$26,000	-	$32,500		$1,820	-	$2,275
Year 9 Equipment Maintenance	7%		$26,000	-	$32,500		$1,820	-	$2,275
Year 10 Equipment Maintenance	7%		$26,000	-	$32,500		$1,820	-	$2,275
Life Cycle Equipment Replacement	100%		$26,000	-	$32,500		$26,000	-	$32,500
Total Maintenance/Replacement							**$44,200**	**-**	**$55,250**
TOTAL 10-YEAR COST							**$106,441**	**-**	**$133,695**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY CITY HARBOR/MARINA

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	0		$ 4,500	-	$ 5,500		$0	-	$0
Portable Radios - High End	0		$ 3,500	-	$ 5,000		$0	-	$0
Mobile Radios - Mid Range	6		$ 2,000	-	$ 2,500		$12,000	-	$15,000
Portable Radios - Mid Range	5		$ 2,000	-	$ 2,500		$10,000	-	$12,500
Subtotal							$22,000	-	$27,500
Shared Costs									
Engineering Study	0.397%		$ 368,250	-	$ 466,850		$1,460	-	$1,851
Trunked System Fixed Equipment	0.397%		$ 3,750,000	-	$ 4,950,000		$14,870	-	$19,629
Trunked System Implementation Services	0.397%		$ 1,125,000	-	$ 1,485,000		$4,461	-	$5,889
Site Remediation	0.397%		$ 2,490,000	-	$ 2,902,000		$9,874	-	$11,508
Subtotal							$30,665	-	$38,876
Total Initial Costs							**$52,665**	-	**$66,376**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$22,000	-	$27,500		$1,540	-	$1,925
Year 2 Equipment Maintenance	7%		$22,000	-	$27,500		$1,540	-	$1,925
Year 3 Equipment Maintenance	7%		$22,000	-	$27,500		$1,540	-	$1,925
Year 4 Equipment Maintenance	7%		$22,000	-	$27,500		$1,540	-	$1,925
Year 5 Equipment Maintenance	7%		$22,000	-	$27,500		$1,540	-	$1,925
Year 6 Equipment Maintenance	7%		$22,000	-	$27,500		$1,540	-	$1,925
Year 7 Equipment Maintenance	7%		$22,000	-	$27,500		$1,540	-	$1,925
Year 8 Equipment Maintenance	7%		$22,000	-	$27,500		$1,540	-	$1,925
Year 9 Equipment Maintenance	7%		$22,000	-	$27,500		$1,540	-	$1,925
Year 10 Equipment Maintenance	7%		$22,000	-	$27,500		$1,540	-	$1,925
Life Cycle Equipment Replacement	100%		$22,000	-	$27,500		$22,000	-	$27,500
Total Maintenance/Replacement							**$37,400**	**-**	**$46,750**
TOTAL 10-YEAR COST							**$90,065**	**-**	**$113,126**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY CITY INFORMATION SERVICES

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	0		$ 4,500	-	$ 5,500		$0	-	$0
Portable Radios - High End	0		$ 3,500	-	$ 5,000		$0	-	$0
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	10		$ 2,000	-	$ 2,500		$20,000	-	$25,000
Subtotal							$20,000	-	$25,000
Shared Costs									
Engineering Study	0.360%		$ 368,250	-	$ 466,850		$1,328	-	$1,683
Trunked System Fixed Equipment	0.360%		$ 3,750,000	-	$ 4,950,000		$13,518	-	$17,844
Trunked System Implementation Services	0.360%		$ 1,125,000	-	$ 1,485,000		$4,056	-	$5,353
Site Remediation	0.360%		$ 2,490,000	-	$ 2,902,000		$8,976	-	$10,461
Subtotal							$27,878	-	$35,342
Total Initial Costs							**$47,878**	-	**$60,342**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 2 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 3 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 4 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 5 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 6 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 7 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 8 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 9 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 10 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Life Cycle Equipment Replacement	100%		$20,000	-	$25,000		$20,000	-	$25,000
Total Maintenance/Replacement							**$34,000**	**-**	**$42,500**
TOTAL 10-YEAR COST							**$81,878**	**-**	**$102,842**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY CITY OFF-STREET PARKING

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	0		$ 4,500	-	$ 5,500		$0	-	$0
Portable Radios - High End	0		$ 3,500	-	$ 5,000		$0	-	$0
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	8		$ 2,000	-	$ 2,500		$16,000	-	$20,000
Subtotal							$16,000	-	$20,000
Shared Costs									
Engineering Study	0.288%		$ 368,250	-	$ 466,850		$1,062	-	$1,346
Trunked System Fixed Equipment	0.288%		$ 3,750,000	-	$ 4,950,000		$10,815	-	$14,275
Trunked System Implementation Services	0.288%		$ 1,125,000	-	$ 1,485,000		$3,244	-	$4,283
Site Remediation	0.288%		$ 2,490,000	-	$ 2,902,000		$7,181	-	$8,369
Subtotal							$22,302	-	$28,274
Total Initial Costs							**$38,302**	-	**$48,274**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 2 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 3 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 4 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 5 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 6 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 7 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 8 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 9 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 10 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Life Cycle Equipment Replacement	100%		$16,000	-	$20,000		$16,000	-	$20,000
Total Maintenance/Replacement							**$27,200**	**-**	**$34,000**
TOTAL 10-YEAR COST							**$65,502**	**-**	**$82,274**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY CITY PARKING ENFORCEMENT

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	0		$ 4,500	-	$ 5,500		$0	-	$0
Portable Radios - High End	0		$ 3,500	-	$ 5,000		$0	-	$0
Mobile Radios - Mid Range	9		$ 2,000	-	$ 2,500		$18,000	-	$22,500
Portable Radios - Mid Range	16		$ 2,000	-	$ 2,500		$32,000	-	$40,000
Subtotal							$50,000	-	$62,500
Shared Costs									
Engineering Study	0.901%		$ 368,250	-	$ 466,850		$3,319	-	$4,207
Trunked System Fixed Equipment	0.901%		$ 3,750,000	-	$ 4,950,000		$33,796	-	$44,611
Trunked System Implementation Services	0.901%		$ 1,125,000	-	$ 1,485,000		$10,139	-	$13,383
Site Remediation	0.901%		$ 2,490,000	-	$ 2,902,000		$22,441	-	$26,154
Subtotal							$69,694	-	$88,355
Total Initial Costs							**$119,694**	-	**$150,855**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$50,000	-	$62,500		$3,500	-	$4,375
Year 2 Equipment Maintenance	7%		$50,000	-	$62,500		$3,500	-	$4,375
Year 3 Equipment Maintenance	7%		$50,000	-	$62,500		$3,500	-	$4,375
Year 4 Equipment Maintenance	7%		$50,000	-	$62,500		$3,500	-	$4,375
Year 5 Equipment Maintenance	7%		$50,000	-	$62,500		$3,500	-	$4,375
Year 6 Equipment Maintenance	7%		$50,000	-	$62,500		$3,500	-	$4,375
Year 7 Equipment Maintenance	7%		$50,000	-	$62,500		$3,500	-	$4,375
Year 8 Equipment Maintenance	7%		$50,000	-	$62,500		$3,500	-	$4,375
Year 9 Equipment Maintenance	7%		$50,000	-	$62,500		$3,500	-	$4,375
Year 10 Equipment Maintenance	7%		$50,000	-	$62,500		$3,500	-	$4,375
Life Cycle Equipment Replacement	100%		$50,000	-	$62,500		$50,000	-	$62,500
Total Maintenance/Replacement							**$85,000**	**-**	**$106,250**
TOTAL 10-YEAR COST							**$204,694**	**-**	**$257,105**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY CITY PARKING MAINTENANCE

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	0		$ 4,500	-	$ 5,500		$0	-	$0
Portable Radios - High End	0		$ 3,500	-	$ 5,000		$0	-	$0
Mobile Radios - Mid Range	4		$ 2,000	-	$ 2,500		$8,000	-	$10,000
Portable Radios - Mid Range	4		$ 2,000	-	$ 2,500		$8,000	-	$10,000
Subtotal							$16,000	-	$20,000
Shared Costs									
Engineering Study	0.288%		$ 368,250	-	$ 466,850		$1,062	-	$1,346
Trunked System Fixed Equipment	0.288%		$ 3,750,000	-	$ 4,950,000		$10,815	-	$14,275
Trunked System Implementation Services	0.288%		$ 1,125,000	-	$ 1,485,000		$3,244	-	$4,283
Site Remediation	0.288%		$ 2,490,000	-	$ 2,902,000		$7,181	-	$8,369
Subtotal							$22,302	-	$28,274
Total Initial Costs							**$38,302**	-	**$48,274**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 2 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 3 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 4 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 5 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 6 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 7 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 8 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 9 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Year 10 Equipment Maintenance	7%		$16,000	-	$20,000		$1,120	-	$1,400
Life Cycle Equipment Replacement	100%		$16,000	-	$20,000		$16,000	-	$20,000
Total Maintenance/Replacement							**$27,200**	**-**	**$34,000**
TOTAL 10-YEAR COST							**$65,502**	**-**	**$82,274**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY CITY RECREATION SERVICES

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	0		$ 4,500	-	$ 5,500		$0	-	$0
Portable Radios - High End	0		$ 3,500	-	$ 5,000		$0	-	$0
Mobile Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Portable Radios - Mid Range	10		$ 2,000	-	$ 2,500		$20,000	-	$25,000
Subtotal							$20,000	-	$25,000
Shared Costs									
Engineering Study	0.360%		$ 368,250	-	$ 466,850		$1,328	-	$1,683
Trunked System Fixed Equipment	0.360%		$ 3,750,000	-	$ 4,950,000		$13,518	-	$17,844
Trunked System Implementation Services	0.360%		$ 1,125,000	-	$ 1,485,000		$4,056	-	$5,353
Site Remediation	0.360%		$ 2,490,000	-	$ 2,902,000		$8,976	-	$10,461
Subtotal							$27,878	-	$35,342
Total Initial Costs							**$47,878**	-	**$60,342**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 2 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 3 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 4 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 5 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 6 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 7 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 8 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 9 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Year 10 Equipment Maintenance	7%		$20,000	-	$25,000		$1,400	-	$1,750
Life Cycle Equipment Replacement	100%		$20,000	-	$25,000		$20,000	-	$25,000
Total Maintenance/Replacement							**$34,000**	**-**	**$42,500**
TOTAL 10-YEAR COST							**$81,878**	**-**	**$102,842**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

MONTEREY COUNTY PUBLIC WORKS

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	0		$ 4,500	-	$ 5,500		$0	-	$0
Portable Radios - High End	0		$ 3,500	-	$ 5,000		$0	-	$0
Mobile Radios - Mid Range	92		$ 2,000	-	$ 2,500		$184,000	-	$230,000
Portable Radios - Mid Range	68		$ 2,000	-	$ 2,500		$136,000	-	$170,000
Subtotal							$320,000	-	$400,000
Shared Costs									
Engineering Study	5.768%		$ 368,250	-	$ 466,850		$21,240	-	$26,927
Trunked System Fixed Equipment	5.768%		$ 3,750,000	-	$ 4,950,000		$216,294	-	$285,508
Trunked System Implementation Services	5.768%		$ 1,125,000	-	$ 1,485,000		$64,888	-	$85,652
Site Remediation	5.768%		$ 2,490,000	-	$ 2,902,000		$143,619	-	$167,383
Subtotal							$446,042	-	$565,471
Total Initial Costs							**$766,042**	-	**$965,471**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$320,000	-	$400,000		$22,400	-	$28,000
Year 2 Equipment Maintenance	7%		$320,000	-	$400,000		$22,400	-	$28,000
Year 3 Equipment Maintenance	7%		$320,000	-	$400,000		$22,400	-	$28,000
Year 4 Equipment Maintenance	7%		$320,000	-	$400,000		$22,400	-	$28,000
Year 5 Equipment Maintenance	7%		$320,000	-	$400,000		$22,400	-	$28,000
Year 6 Equipment Maintenance	7%		$320,000	-	$400,000		$22,400	-	$28,000
Year 7 Equipment Maintenance	7%		$320,000	-	$400,000		$22,400	-	$28,000
Year 8 Equipment Maintenance	7%		$320,000	-	$400,000		$22,400	-	$28,000
Year 9 Equipment Maintenance	7%		$320,000	-	$400,000		$22,400	-	$28,000
Year 10 Equipment Maintenance	7%		$320,000	-	$400,000		$22,400	-	$28,000
Life Cycle Equipment Replacement	100%		$320,000	-	$400,000		$320,000	-	$400,000
Total Maintenance/Replacement							**$544,000**	**-**	**$680,000**
TOTAL 10-YEAR COST							**$1,310,042**	**-**	**$1,645,471**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

MONTEREY COUNTY NGEN TASK FORCE
AGENCY COST ESTIMATE

SALINAS MAINTENANCE SERVICES

Cost Category	Qty / %	x	Unit/Base Cost Range			=	Extended Cost Range		
Initial Costs									
Agency Mobiles and Portables									
Mobile Radios - High End	0		$ 4,500	-	$ 5,500		$0	-	$0
Portable Radios - High End	0		$ 3,500	-	$ 5,000		$0	-	$0
Mobile Radios - Mid Range	103		$ 2,000	-	$ 2,500		$206,000	-	$257,500
Portable Radios - Mid Range	0		$ 2,000	-	$ 2,500		$0	-	$0
Subtotal							$206,000	-	$257,500
Shared Costs									
Engineering Study	3.713%		$ 368,250	-	$ 466,850		$13,673	-	$17,334
Trunked System Fixed Equipment	3.713%		$ 3,750,000	-	$ 4,950,000		$139,239	-	$183,796
Trunked System Implementation Services	3.713%		$ 1,125,000	-	$ 1,485,000		$41,772	-	$55,139
Site Remediation	3.713%		$ 2,490,000	-	$ 2,902,000		$92,455	-	$107,753
Subtotal							$287,139	-	$364,022
Total Initial Costs							**$493,139**	-	**$621,522**
Mobile/Portable Maintenance and Replacement									
Year 1 Equipment Maintenance	7%		$206,000	-	$257,500		$14,420	-	$18,025
Year 2 Equipment Maintenance	7%		$206,000	-	$257,500		$14,420	-	$18,025
Year 3 Equipment Maintenance	7%		$206,000	-	$257,500		$14,420	-	$18,025
Year 4 Equipment Maintenance	7%		$206,000	-	$257,500		$14,420	-	$18,025
Year 5 Equipment Maintenance	7%		$206,000	-	$257,500		$14,420	-	$18,025
Year 6 Equipment Maintenance	7%		$206,000	-	$257,500		$14,420	-	$18,025
Year 7 Equipment Maintenance	7%		$206,000	-	$257,500		$14,420	-	$18,025
Year 8 Equipment Maintenance	7%		$206,000	-	$257,500		$14,420	-	$18,025
Year 9 Equipment Maintenance	7%		$206,000	-	$257,500		$14,420	-	$18,025
Year 10 Equipment Maintenance	7%		$206,000	-	$257,500		$14,420	-	$18,025
Life Cycle Equipment Replacement	100%		$206,000	-	$257,500		$206,000	-	$257,500
Total Maintenance/Replacement							**$350,200**	**-**	**$437,750**
TOTAL 10-YEAR COST							**$843,339**	**-**	**$1,059,272**

Notes

Considers complete replacement of mobiles and portables.
Mobile radio costs include vehicle installation.
Portable radios include carry case, speaker-microphone and spare battery.
Cost Allocation Factor calculated as a percentage of agency radios in countywide fleet/inventory.
Equipment Maintenance calculated at 7% per year of One Time Purchase Cost.
Life Cycle Equipment Replacement represents one (1) replacement cycle of mobiles and portables.
Total Cost of Ownership calculated over ten (10) year period.

APPENDIX B
GLOSSARY OF ACRONYMS

AFGP	Assistance to Firefighters Grant Program
APCO	Association of Public-Safety Communications Officials (International)
AVL	Automatic Vehicle Location
CAD	Computer-Aided Dispatch
CDF	California Division of Forestry (and Fire Protection)
CDPD	Cellular Digital Packet Data
CEDAP	Commercial Equipment Direct Assistance Program
CFR	Code of Federal Regulations
CHP	California Highway Patrol
C-J-S	Commerce-Justice-State
CLETS	California Law-Enforcement Telecommunications System
COPS	Community Oriented Policing Services
CSUMB	California State University Monterey Bay
DHS	Department of Homeland Security
DMV	Department of Motor Vehicles
DSL	Digital Subscriber Line
EMS	Emergency Medical Services
FEMA	Federal Emergency Management Agency
GHz	GigaHertz
GPS	Global Positioning System
ICS	Incident Command System
ITD	Information Technology Department
JAG	Justice Assistance Grant
KHz	KiloHertz
LETPP	Law Enforcement Terrorism Prevention Program
MHz	MegaHertz
MSA	Metropolitan Statistical Area
NCIC	National Crime Information Center
NPSPAC	National Public Safety Planning Advisory Committee
ODP	Office of Domestic Preparedness
P25	Project 25
PSAP	Public Safety Answering Point
RMS	Records Management System
RPC	Regional Planning Committee
SAA	State Administering Agency
SHSGP	State Homeland Security Grant Program
SLGCP	(Office of) State and Local Government Coordination and Preparedness
SVRIP	Silicon Valley Regional Interoperability Project
TA	Transition Administrator
TIA	Telecommunications Industries Association

UASI	Urban Area Security Initiative
UHF	Ultra High Frequency
VHF	Very High Frequency
VoIP	Voice over Internet Protocol
WiFi	Wireless Fidelity
WiMax	Wireless Maximum